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AMEBIC HEPATITIS

REPORT OF THIRTY-THREE CASES

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The term amebic hepatitis has been used by some [1] as synonymous with hepatic amebiasis. Most commonly, however, this term is used to indicate the earlier phase of amebic hepatic disease before frank abscess can be diagnosed. Although at times the patient may not complain until frank abscess is present or even until rupture is imminent,[2] there is much evidence in the literature [3] to indicate the importance as a clinical entity of these earlier phases of amebic hepatic disease. Rogers [3] over thirty years ago described a "presuppurative" stage, by which he meant to differentiate the stage of abscess from simple amebic hepatitis. Actually it is impossible clinically to be certain that small single or multiple abscesses are not present at this time, and diagnosis and treatment at this stage are extremely important. The frequent lack of clarity in discussion of these pictures and the tendency to group amebic hepatitis and amebic hepatic abscess in clinical analyses and statistics have prompted a review of the last 33 cases of amebic hepatitis seen at the New Orleans Charity Hospital and the U. S. Marine Hospital at New Orleans in order to note any differences in the clinical manifestations of these groups and the factors of importance in early diagnosis and, consequently, in early treatment. Certain aspects of some of the cases in the present series have been discussed elsewhere.[4]

CLINICAL PICTURE

All 33 of the patients were adults and 29, or 88 per cent, were men. These findings were to be expected from previous reports. The disease is essentially one of adults, and, in an analysis of hepatic abscess from the records of the Charity Hospital, Ochsner and DeBakey [5] found 157, or 86.7 per cent, of 181 instances in the male. The same authors, in a review of the literature, found that 95 per cent of 1,789 cases occurred in men.

In the present group the clinical picture showed a number of rather constant characterizing features, although the complaints on admission at times led to a search for disease in areas outside the liver. Pain in the region of the liver was a universal complaint. It varied from severe and sharp to dull and aching. At times it was constant, at others intermittent. The patient usually complained of pain in the region of the right costal margin, most frequently in the anterior or axillary region but at times posteriorly as well. Fever was present in all but 1. In the more acute pictures it reached 103 to 104 F., was intermittent in type and in 13, or 40 per cent, of the patients was accompanied by chills. Clinical jaundice was present in only 5, or 15.1 per cent, of the patients. Sallowness of the skin was frequent. Jaundice was therefore not usually present, but its occurrence was sufficiently frequent to bring amebic hepatitis under consideration. Its frequency in amebic hepatitis is variously reported as ranging from 3 to 27 per cent.[5] Other complaints less regularly present included nausea and vomiting, weakness and loss of weight. In only 9, or 27.3 per cent, of the patients was diarrhea present at the onset or during the course of the hepatic picture. Seven others gave a history of diarrhea, bringing its incidence up to 16 of the 33, or 48.5 per cent. The history of diarrhea may antedate the picture for years but, as shown by the figures just given, was more recent in the majority of the cases.

The most important physical findings were hepatomegaly and tenderness in the region of the liver. Enlargement of the liver was found in 29, or 88 per cent, and tenderness with regularity in 100 per cent. Occasionally tenderness was so severe that the presence or absence of a palpable liver could not be established. The spleen was palpable in 4 patients, 2 of whom gave a history of previous malaria. This finding, therefore, was unusual, but it did not exclude the diagnosis.

The total leukocyte count was elevated in 29, or 88 per cent, averaging 13,000. The incidence of positive stools, roentgenologic findings and data on the complement fixation test are given in the accompanying table and are discussed further on along with the several scattered data on liver function tests.

None of the patients showed the low grade symptomatic picture described by Hurst [6] and Castellani.[7] Many had the positive findings described by these authors but had other important findings in addition. The former author described a picture of general unfitness and ease of fatigue with poor appetite, a pale or sallow color, and constant aching and tenderness of the exposed surface of the liver. The levulose test showed evidences of hepatic insufficiency and but rarely were amebic cysts found in the stools. The latter author described a picture interpreted as low grade hepatitis

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1. Munk, J.: X-Ray Appearances in Amebic Hepatitis, Brit. J. Radiol. **17**: 48, 1944.
2. Walters, W.; Watkins, C. H.; Butt, H. R., and Marshall, J. M.: Amebic Abscess of the Liver Unsuspected Until Perforation, J. A. M. A. **125**: 963 (Aug. 5) 1944.
3. Rogers, L.: Amebic Liver Abscess, Lancet **1**: 463 and 677, 1922. Ochsner and DeBakey.[5]
4. Sodeman, W. A., and Lewis, B. O.: Amebic Hepatitis, Am. J. Trop. Med. **25**: 35 (Jan.) 1945.
5. Ochsner, A., and DeBakey, M.: Amebic Hepatitis and Hepatic Abscess, Surgery **13**: 460 and 612, 1943.
6. Hurst, A. F., in Price, F. W.: A Textbook of the Practice of Medicine, ed. 5, New York, Oxford University Press, 1937, p. 713.
7. Castellani, A.: Three Clinical Signs Useful in the Diagnosis of Chronic Amebic Colitis with No Dysenteric Symptoms, Rev. Gastroenterol. **7**: 1, 1940.

with evidences of enlargement of the liver to percussion but with the absence of a palpable liver, fever and leukocytosis. In the picture described by Castellani, criteria are not well established, and the proof of its importance has not yet been established by tissue studies. All of our group showed findings without doubt diagnostic of active hepatic disease. The type of onset and the symptoms in our group did vary with the acuteness or chronicity of the process. In 25, or 75.8 per cent, of the patients there was a distinct sudden onset from which the picture could be easily dated. This figure is much higher than some of those given for hepatic amebiasis in other reports,[5] and in our group of 58 cases of amebic hepatic abscess, including those with pulmonary pictures, only 55 per cent had sudden onset. It is likely, of course, that the more acute pictures would lead to earlier diagnoses, before abscess could be established, and thereby increase the frequency of instances with acute onset in such a group of patients. On occasion the patient may not complain, as already stated, until frank abscess is present or even until rupture is imminent.[2] It is possible that chronic hepatitis of a very low grade, as just mentioned and as described by Hurst and Castellani, could antedate such instances, but our experience does not add weight to such an assumption. In our 8 patients without dramatic onset, that is the chronic group, the clinical findings were essentially of the same type as in the more acute pictures, but of less intensity and less sudden appearance and progress.

Observations in Cases of Amebic Hepatitis and of Amebic Hepatic Abscess

	Amebic Hepatitis (33 Cases)	Amebic Hepatic Abscess (58 Cases)
1. A history of diarrhea or dysentery, or its presence with the hepatic picture	16 (48.5%)	19 (32.7%)
2. The presence of E. histolytica in the stools	18 (54.5%)	10 (20.4%)
3. Roentgenologic signs	15 (45.4%)	47 (81.0%)
4. Chocolate sauce pus	0 (0.0%)	55 (94.8%)
5. Positive complement fixation test	1 (50.0%)	2 (100.0%)

DIAGNOSTIC ASPECTS

As with frank abscess, the presenting complaints at times drew attention to areas other than the liver. In abscess with rupture to or through the diaphragm the process is at times mistaken for primary pulmonary disease. In 12, or 20 per cent, of our 58 cases of hepatic abscess, previously reported,[4] presenting complaints and clinical findings concentrated interest in the right lower pulmonary area with pleural pain, pleural effusion and evidence of pneumonitis as outstanding pictures. All showed, in addition to the pulmonary findings, evidences of hepatic involvement. In the remaining 46 patients the complaints on admission pointed definitely to the abdomen and specifically to the liver. In the present group obviously without spread of the disease to the pulmonary area, the complaints occasionally led to the consideration of a pulmonary diagnosis. This was true in 3 instances (9.1 per cent), and in all 3 the suspicion of pulmonary disease was based entirely on the type of pain. One patient had pain referred to the right shoulder accentuated by breathing; the other 2 knifelike pain along the right costal margin near the midaxillary line, which again led to a consideration of pleurisy as a diagnosis. All in all, in amebic hepatitis pulmonary pictures do not attain the importance they do in certain instances of abscess, and in our group the consideration of pulmonary pictures rested entirely on first impressions of the possible source of pain. Under such circumstances suggestive evidences of pulmonary involvement may be found in the chest roentgenogram, for, with involvement of the diaphragm, immobilization of the right base may at times cause some increased densities in the lower right pulmonary area which have been mistakenly interpreted as pneumonitis.

The clinical pictures were similar to those seen for some days or weeks in developing hepatic abscess. Indeed it is the same process. In the group of patients with amebic hepatitis, as in those diagnosed as amebic hepatic abscess, a number of admission diagnoses other than amebic disease were made. These included cirrhosis and cancer of the liver, acute and chronic cholecystitis, peptic ulcer, infectious hepatitis, pyogenic liver abscess, carcinoma of the colon, pyelonephritis and pleuritis, the diagnosis varying with the onset, severity and type of picture. In 1 instance there was at the onset a lack of localizing signs in the liver area, so that the differential diagnosis involved the consideration of febrile disease without localizing signs; for example, brucellosis and malaria. Those conditions which at times fall into a group called "fever of undetermined origin" are therefore considered in differential diagnosis. This list of diagnoses does not represent all the conditions with which amebic hepatitis may be confused. It does represent those which came under consideration in our patients before the true diagnosis was made.

The most important fact which our series shows is the need for consideration in diagnosis of the possibility of the occurrence of hepatic amebiasis. In the hospitals with which we are associated some of the conditions that have been listed are many times more common than hepatic amebiasis. The same is true in many, if not all, communities in this country, and the possibility of the occurrence of amebic hepatic disease does not always come to mind. In some tropical areas in which hepatic amebiasis is more common in relationship to these other pictures, the possibility of its presence is uppermost in the mind of the examiner. This is not true, in general, in our community, and the condition does not always come to mind. This our records show very clearly. Awareness of the possible occurrence of hepatic amebiasis was therefore the most important single factor in the early establishment of the diagnosis. Without it, diagnoses were either late or accidental. Most important is the fact that geography cannot be used to rule out the possibility, for amebiasis is found wherever it is sought.

As already stated, the clinical findings described as making up the symptom complex of amebic hepatitis included leukocytosis in 88 per cent of our patients. This is an extremely important finding, although the white blood count may vary into the range of normal from time to time in the same patient. The average count in our patients was 13,000, the highest being 26,000 and the lowest 6,200. In general the counts were higher in the more acute pictures. With abscess Ochsner and DeBakey[5] found an average of 16,460, and in pyogenic abscess of the liver 26,924. Eosinophilia was not in evidence. The percentage of neutrophils averaged 74. While the absence of leukocytosis is a point against the possible diagnosis of amebic hepatitis, repetition of the white blood count is indicated because of its variability, and search for collateral diagnostic data for amebiasis is still indicated because of the occurrence of normal counts in 12 per cent or more of the cases.

The occurrence of jaundice in 15 per cent of our patients produced a clinical entity which simulated certain other types of hepatitis generally considered in the differential diagnosis of so-called catarrhal jaundice and acute infectious hepatitis. Here the presence of leukocytosis and the collateral diagnostic data for amebiasis which we have already mentioned are extremely important. Several of the other types of specific hepatitis may also give leukocytosis. Within a period of three days one of us recently saw 3 patients with fever, jaundice and enlargement and tenderness of the liver and elevated white blood counts. Each of these patients showed one of the specific types of hepatitis seen in our community, amebic hepatitis, Weil's disease and infectious mononucleosis. Palpability or lack of palpability of the spleen was not helpful in differential diagnosis. With amebic hepatitis and jaundice our patients have shown icterus indexes as high as 70, positive urobilinogen tests, mild reductions in serum proteins in 2 patients, indirect positive van den Bergh tests in 3 and impaired hippuric acid secretion and galactose tolerance tests in 1 patient each. The cephalin flocculation test was positive in the 1 case in which it was done. Bile was present in the stools in all 5 patients with jaundice. Obviously our data on liver function tests in these patients are inadequate and fragmentary. More adequate investigations from this standpoint are necessary to make these tests of value in diagnosis.

Demonstration of the etiologic agent in any disease places therapy on solid ground. Amebiasis is no exception and the study of the stools in suspected colonic involvement, especially with a check of at least three stools followed by a purge specimen, is said to have an efficiency in diagnosis of about 90 per cent.[8] However, in hepatic involvement, diagnosis and treatment are almost invariably carried out without demonstration of Endameba histolytica in the liver or its discharges. The organism cannot be demonstrated in the involved structures until pus is obtained, and even then it is found with difficulty. The gross appearance of the pus is so characteristic that, for practical purposes, it is diagnostic, although occasionally pus of this appearance is not amebic, and amebic pus occasionally is light creamy in appearance. In our group of 58 cases previously reported, the diagnosis was finally settled in this way in 55. However, pus was demonstrated early in the observation of the patient in only 27 of the 55 instances, which indicates the delay in diagnosis and treatment entailed by temporizing for this final criterion. If the diagnosis is suspected from the clinical pictures already described, certain data may be actively sought before pus is demonstrated to arouse the clinical suspicion of the disease to a level sufficiently high to warrant treatment. These findings and the frequency of their occurrence in the present group of patients, as well as in the group previously reported with abscess, are shown in the table. It will be seen that not one of the collateral items is in itself diagnostic of hepatic amebiasis, but since the diagnosis of this disease approaches desirable criteria only when characteristic pus is obtained, and since this is late in the disease, we must depend on findings less diagnostic than the ideal or sit back and wait until the disease has progressed to its advanced stages. In 50 of the cases diagnosed as abscess, the onset of the picture was established with some certainty and varied from two weeks to five months, with an average of six and a half weeks from onset until the diagnosis was satisfactorily established. This time interval indicates that a search for the collateral data given in the table may lead to a presumptive diagnosis of amebic hepatic disease in the absence of the demonstration of other causes for the clinical picture and will warrant active therapy with emetine before pus is obtained.

The differentiation of patients into two groups, one with simple amebic hepatitis and the other with amebic hepatic abscess, is a purely clinical division and from the standpoint of treatment is extremely important. By no means short of autopsy can one clearly establish a diagnosis of hepatitis without abscess. Although Rogers described a presuppurative stage, it is impossible to be certain that small single or multiple abscesses are not present without location or size which cause bulging. Amebic hepatitis is the earlier stage of the disease and, even when some liquefaction has taken place in the hepatic lesions, closed drainage is not essential to cure. Emetine alone [9] is known to be successful at times, even when pus is present. Even large abscesses may at times disappear with emetine therapy alone, but in most such cases evacuation of pus is necessary and should not be delayed if danger of rupture is imminent. Two to four days of emetine therapy should be carried out before aspiration when possible, and will, in effect, eliminate the necessity for aspiration at times, as well as reduce the complications attendant on aspiration if it is found necessary. The presence of secondary bacterial infection in abscess cavities has demanded resort to open rather than closed drainage, a procedure which is accompanied by a sharp increase in mortality. Recently the use of sulfonamides [10] and penicillin [11] has been shown to permit closed drainage when organisms sensitive to these agents have been the contaminants.

Berne's remarks [12] on the process going on in the liver are important. He emphasized that it represents a special type of liver necrosis, as is a gumma, and that emetine is approximately as specific as is neoarsphenamine. He further emphasized that, if it was looked on as being similar to a broken down gumma with aseptic evacuation of its contents often required to eliminate a foreign body factor, the proper orientation for treatment would be established. Dangers of rupture and spread of the process with additional mortality from these complications demand closed drainage, preferably preceded by emetine when pus is located.

Since the diagnosis is a matter of estimation of the stage of the process, one should not expect a remarkable difference between the two in factors 1, 2 and 5 in the table. The differences rest most probably on at least two bases, first variations in the diligence of examiners in the various hospital services and secondly on the small size of the groups, which renders comparative figures difficult to interpret. Colonic infection probably always precedes the hepatic lesion but in many instances is not clinically active. Right sided colonic disease particularly may give little in the way of symptoms or signs. In only 32 per cent of those diagnosed as having abscess and in 48.5 per cent of those diag-

8. Sawitz, W. G., and Hammerstrom, R. J.: The Statistical Significance of a Negative Stool Examination in the Diagnosis of Amebiasis, Am. J. Hyg. **38**: 1, 1943.

9. Hodson, V. S.: The Treatment of Hepatic Abscess with Emetine, J. Trop. Med. **24**: 108, 1921. Greig, E. D. W.: Case of Amebic Abscess of the Liver Without Antecedent Dysentery, ibid. **43**: 119, 1940; Observations on a Case of Amebic Hepatitis, ibid. **43**: 161, 1940. Ochsner and DeBakey.[5] Sodeman and Lewis.[4]

10. Alpert, A. C., and Ghalioughi, P.: Conservative Treatment of Liver Abscess, Lancet **2**: 1062, 1939.

11. Noth, P. H., and Hirshfeld, J. W.: Amebic Abscess of the Liver with Secondary Infection, J. A. M. A. **124**: 643 (March 4) 1944.

12. Berne, C. J.: Diagnosis and Treatment of Amebic Liver Abscess, Surg., Gynec. & Obst. **75**: 235, 1942.

nosed as having amebic hepatitis, a history of diarrhea was obtained. These figures vary considerably in reported groups of hepatic amebiasis in the literature. In some groups the history of diarrhea has occurred in as high as 90 per cent of the patients.[13] This finding became more important clinically when it was recent and the characteristics were clear in the patient's mind. Certainly with a story having the characteristics of amebic dysentery in the presence of the hepatic picture as described when the considerations in differential diagnosis already given are exhausted, a therapeutic trial with emetine is indicated. It must be noted that absence of diarrhea is sufficiently frequent that the lack of a positive history is not helpful in exclusion of the diagnosis. Again, the establishment of the diarrhea as a manifestation of amebiasis or the finding of positive stools without a diarrhea was extremely important, for it established in the patient the presence of the etiologic agent. E. histolytica has been reported as present in from 4 to 70 per cent of patients with amebic hepatic disease.[14] In our group examinations were not always adequate, so that the figures should be higher than those stated. In New Orleans, where over 10 per cent of the clinic population has cysts of E. histolytica in the stools,[15] obviously in approximately that percentage of patients with any disease—whether cirrhosis of the liver, peptic ulcer or any other disturbance—stools would be likely to be positive. This finding, therefore, is not pathognomonic of hepatic amebiasis, but under any circumstances it establishes the presence of the causative agent in the body of the patient, and in the presence of the hepatic pictures we have described, without any other adequate explanation for that picture, a course of emetine is indicated.

In our hands this has consisted of six to ten daily injections, preferably intramuscularly, of 1 grain (0.06 Gm.) of emetine hydrochloride followed by a full course of diodoquin (three tablets of 3.2 grains [0.2 Gm.] each three times daily for five days) whether or not E. histolytica has been demonstrated in the stools, for the colon is the assumed source. Prolonged use of emetine may lead to cardiac damage. Arrhythmia and congestive heart failure are the chief findings, and diarrhea, nausea, vomiting, prostration, muscular pains and weakness may develop. In our patients restriction of the dose to that just stated has resulted in untoward results in only 1 of 91 patients.

One cannot overemphasize in amebic hepatitis the importance of the roentgenographic examination, especially fluoroscopic study for impaired or paradoxical motion as well as elevation of the diaphragm. Recently emphasis has been placed on lesser degrees of restricted movement of the diaphragm, which may be the only sign of liver involvement.[1] Munk has emphasized Müller's test (positive with upward movement of the diaphragm on inspiration against a closed glottis) and Hitzenberger's test (the same action with "sniffing"). Both of these tests may be positive in phrenic paralysis, eventration of the diaphragm or local damage to the diaphragmatic muscle. Pleurisy from any cause may impair diaphragmatic movement, and elevation of the diaphragm occurs from all types of increased intra-abdominal pressure as well as from infectious hepatitis and other types of hepatomegaly. Some types of pulmonary disease, bronchostenosis, for example, may give paradoxical movement of the diaphragm. Also in amebic hepatitis or amebic hepatic abscess the diaphragm may show no change if the upper portion of the liver is not remarkably involved.

In the present group roentgenologic signs were absent in 18 of the 33 patients, or 54.6 per cent. With the development of abscess roentgenologic findings were twice as frequent, with evidence of bulging or of extension of the disease in 56.9 per cent of the patients and positive roentgenologic findings in 81 per cent. Evidences of bulging or extension of the disease were absent in the patients with hepatitis, where elevation and impaired movement of the diaphragm were the only findings. The latter finding alone occurred in 18, or 31 per cent, of our patients with abscess, a figure more in keeping with the 45.4 per cent in hepatitis. Thus, roentgenologic findings become more positive in the more advanced pictures, finally acting as an important guide for the aspiration of pus. We need not mention other evidences of abscess formation, for we are not concerned with these advanced pictures here. They have been ably discussed by Ochsner and DeBakey.[5]

In the patients diagnosed as having amebic hepatitis, pus was, of course, not demonstrated. Chocolate-sauce appearance is the closest approach to a final diagnostic criterion, and its absence makes the other collateral data extremely important in the establishment of a diagnosis. The occurrence in combination in the same patient of several of these findings makes the presumptive diagnosis one of high degree. Twelve of the patients showed the findings 1 with 2, 3 or both in the table. Seven showed 1 or 2 without 3. In only 2 was 5, the complement fixation test of Craig, done. One was positive, the other anticomplementary. This is the most glaring inadequacy in our data. Certainly awareness of the possible occurrence of amebic hepatitis from the clinical picture together with the positive complement fixation test would give the earliest possible combination for a presumptive diagnosis which would lead to early therapy. Such an approach would reduce the number of patients reaching the stage in which pus is demonstrable. In our abscess group the mortality rate was 5.2 per cent; in the group with hepatitis, 0 per cent. Hence the need for further development and more widespread use of the complement fixation test is evident. There are certain technical problems at present which interfere with the widespread use of, and the reliability of, this test.[16] At present we must send material away for the complement fixation test, and the problem in diagnosis has usually been settled by the time the results are obtained. Collateral diagnostic data were helpful in 24 of the 33 patients. In 9 the diagnosis was unsupported by collateral findings. Here the complement fixation test would have been particularly helpful.

Many times then, as we have stated previously,[4] the clinician standing at the bedside of the patient should and must make a diagnosis in the presence of the clinical picture but in the absence of absolute data, despite the fact that he is extremely anxious for such information and may have sought it diligently. If he elects to withhold specific treatment because of the inadequacy of diagnostic findings, the picture will either progress to resolution as a natural course of events or progress until definite evidence, either by bulging or by rupture,

13. Simonds, J. P.: Complications of Amebiasis, Quart. Bull., Northwestern Univ. M. School **17**: 25, 1943.
14. Ochsner and DeBakey,[5] Berne.[12]
15. Faust, E. C.: The Prevalence of Amebiasis in the Western Hemisphere, Am. J. Trop. Med. **22**: 93, 1942.
16. Rees, C. W.; Bozicevich, J.; Reardon, L. V., and Jones, F.: A Preliminary Note on the Complement Fixation Test for Amebiasis with Antigen Prepared from Entameba Histolytica Grown with a Single Species of Bacteria, Am. J. Trop. Med. **22**: 581, 1942.

indicates the presence of hepatic abscess. His alternative is to elect to treat the patient with emetine because of the high clinical suspicion of the disease and to determine through therapeutic results the presence of amebic hepatitis or, with high probability, the absence of this disease if therapy is not effective. In our opinion the latter course is the more desirable for, as we have said, in our groups the comparative mortality has been 5.2 and 0 per cent respectively. This situation is by no means peculiar to hepatic amebiasis. In pulmonary tuberculosis the diagnosis rests on the demonstration of the tubercle bacillus in the sputum or in the tissues. The clinician's greatest desire, however, is to diagnose and treat the disease sufficiently early so that it is impossible to demonstrate clinically the presence of the tubercle bacillus. This desire should also apply to amebic hepatic disease. In any disease in which results in therapy are based primarily on early diagnosis, the absolute criteria for diagnosis are likely to be absent. Errors in diagnosis are likely to occur, but if one waits until criteria are absolutely fulfilled great hazard is added to the life of the patient and potential benefits from treatment are greatly reduced. No better examples of these principles can be found than in the early treatment of tuberculosis, carcinoma and amebic hepatic disease.

The history and physical examination uncovering the hepatic clinical picture already described do not warrant a therapeutic test until other possibilities in diagnosis are considered and evidence speaks against them, while the awareness of the possible occurrence of amebic infection is leading to efforts to establish the presence of colonic amebiasis, roentgenologic findings in the liver area, a positive complement fixation test or, finally, pus, if a desirable area for tap is found. The promiscuous use of emetine, without the aforementioned attempts, is to be discouraged.

If treatment with emetine is rewarded by cure, two possibilities exist. Either the therapy and cure were coincidental, or there was a cause and effect relationship. The former is possible if the diagnosis has been in error. The latter is also possible with errors in diagnosis. Emetine is credited with striking therapeutic effects in other diseases involving the liver,

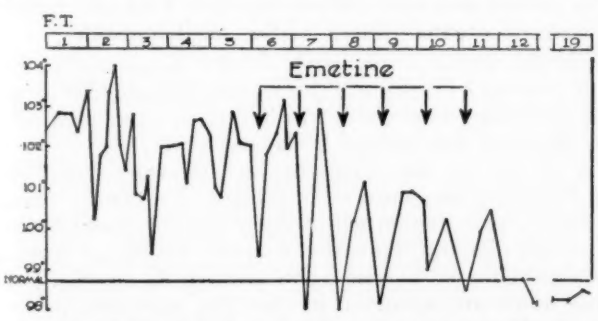

Chart 1.—Temperature of a patient in the present series, showing characteristic response to emetine therapy.

including schistosomiasis, fascioliasis and paragonimiasis.[17] These possibilities are brought out in the temperature charts. Chart 1 gives the temperature of a patient in the present group who showed the clinical evidence we have described in the presence of positive roentgenologic findings and E. histolytica cysts in the stools. The effect of emetine therapy, as indicated in the chart, was the clearing of the entire picture and the return of the temperature to normal. A period of one week is omitted from the chart, as indicated, in order to conserve space. Follow-up on this patient indicated that there was no return of the picture over a period of eighteen months. Chart 2 is that of a patient who had a comparable picture with tenderness and enlargement of the liver but without positive roentgenologic findings and without colonic amebiasis and

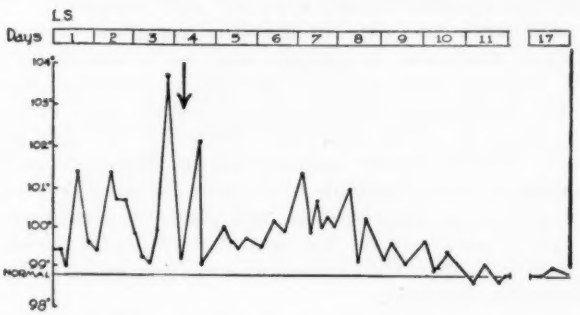

Chart 2.—Temperature of a patient not in the present series but with a similar clinical picture and no confirmatory collateral findings. The arrow indicates the time at which emetine might have been given and cure assumed from the response.

in whom the diagnosis was therefore in doubt. The arrow indicates the time at which emetine probably would have been given if the diagnosis had been strongly suspected from the collateral findings. However, the patient was not treated and the resolution of the fever, as shown in the chart, was spontaneous. The clinical picture also cleared and over a period of fifteen months repeated examinations of the stools for E. histolytica were negative and there was no recurrence of the symptoms or signs which prompted the admission to the hospital. Because of inadequate criteria for diagnosis, an occasional self-limited disease of the liver may be treated as amebiasis. Brookfield[17] has recently reported such a case with spontaneous recovery.

While spontaneous cure or a remission in hepatic amebiasis is possible, the added risk attending the progress of the picture to a definite stage of abscess is so great that no one should permit it merely to satisfy his diagnostic curiosity. The introduction of closed drainage with emetine reduced the mortality from amebic hepatic abscess from figures over 50 per cent to 5 to 14 per cent.[5] Awareness of the possibility of the occurrence of this disease, when the clinical findings occur, plus early treatment with adequate doses of emetine alone should make this figure approach zero.

CONCLUSIONS

1. The most important factor in the early recognition of amebic hepatitis is the awareness of the possible occurrence of the disease.

2. The presence of jaundice in about 15 per cent of the patients with amebic hepatitis in this series indicates the necessity for consideration of amebiasis as a cause of hepatitis with jaundice along with Weil's disease, infectious mononucleosis and other specific types of hepatitis when this picture presents itself. Evidences of impaired liver function by various liver function tests may be present. Our data on these points are fragmentary, and more investigations of this type on such patients are indicated.

3. Early diagnosis of hepatic amebiasis was shown in our group of patients to rest on collateral diagnostic findings, especially the presence of intestinal amebiasis, roentgenologic signs and the complement fixation test. More widespread use of the latter test is indicated.

17. Brookfield, R. W.: Acute Hepatitis Without Jaundice in West Africa, Tr. Roy. Soc. Trop. Med. & Hyg. **38**: 25, 1944.

4. Early diagnosis, before the stage in which pus could be demonstrated, in our group, led to effective treatment with emetine alone. Dangerous procedures and the stage of the disease in which prognosis is at its worst were thereby avoided, with pronounced reduction in the mortality rate.

5. Diagnoses based on the criterion of characteristic pus will always be late, and our chances of an early preventive and therapeutic approach will be small.

6. Diligence and care in the demonstration of evidences of amebiasis in patients with such clinical pictures, through stool and roentgenologic examinations, and the complement fixation test, together with clinical acumen in ruling out other causes of the clinical picture, should reduce both errors in diagnosis and promiscuous use of emetine to a minimum, and, despite occasional errors in diagnosis, will place the treatment of hepatic amebiasis on the desirable plane on which the treatment of early carcinoma and early pulmonary tuberculosis now rests.

CRITERIA IN THE MANAGEMENT OF CHRONIC ILEITIS

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Before regional ileitis was established as a disease entity by Crohn and his co-workers [1] in 1932, this condition was thought to be a form of tuberculous enteritis. In many instances the existence of a small intestinal lesion was not even recognized, owing to a well known lag in the development of both clinical and roentgenologic diagnosis of disease of the small intestine.

DIAGNOSIS

Our first diagnoses of regional ileitis were made in flagrant cases of this condition with extensive and chronic lesions. As we have learned more concerning the clinical course and the corresponding pathologic changes that occur in the wall of the small bowel, the diagnosis has been made in the earlier stages and in instances of less extensive disease.

In any attempt to set up minimal criteria for the diagnosis of regional ileitis, the acute forms must be considered separately from the chronic stage.

The onset of ileitis may be gradual and insidious, with grumbling right lower quadrant symptoms and mild diarrhea, which in a few weeks may become severe enough to lead to either roentgenologic study or a laparotomy. There is also an acute onset characterized by abdominal pain localizing in the right lower quadrant with vomiting and diarrhea. Fever, leukocytosis, tenderness and muscle spasm may complete a clinical picture that is indistinguishable from acute appendicitis, with a result that many diagnoses of acute ileitis are made at the operating table.

Acute Ileitis.—In the present study of 107 cases of ileitis, 11 patients had the disease in the early acute stage. This was proved in every case by laparotomy, at which the surgeon reported inflamed, edematous and thickened loops of small intestine and acute lymphadenitis in the mesenteric nodes.

This is not an accurate indication of the relative incidence of the acute and chronic stages of ileitis, since this material was taken from a gastroenterologic and surgical service organized chiefly for the treatment of chronic disease. Relatively few abdominal emergencies are admitted.

Of the 11 cases diagnosed early acute ileitis at operation, 7 had roentgenologic examination just before the operation and 1 within a few days after the abdomen was explored. Of these 7 cases, 5 showed variations from the normal appearance of the small intestine.

These cases, although few in number, constitute an important group because they supply clinical and roentgenologic data on proved cases of ileitis in its earliest stages when organic pathologic changes are minimal.

Figure 1 is a roentgenogram of a patient with early ileitis who had had abdominal pain and mild diarrhea for several weeks and an acute flare-up of right lower quadrant pain and tenderness, fever and a leukocytosis of 14,000. An operation for suspected acute appendicitis disclosed typical acute terminal ileitis. This roentgenogram was made fourteen days after the laparotomy and demonstrates the minimal changes in the terminal ileum which can be considered diagnostic. Only when these changes are relatively constant in a series of roentgenograms are they really convincing. In an analysis of the evidence of disease shown in this roentgenogram, the following features may be listed:

1. Some hypermotility in the small bowel.
2. Somewhat widely separated loops of terminal ileum suggesting thickening of the intestinal wall and mesentery.
3. Unusually long segments of pronounced spasm.
4. Irregularities of the mucosal pattern suggesting edema of the mucosa with flattening and rearrangement of the folds.

These roentgenologic details should prevent confusion with such findings as shown in figure 2. This roentgenogram shows definite segmentation of the barium in the ileum. These segments are more or less uniform in size, while serial roentgenograms show no constancy in their shape. The string sign is absent. These findings, which may be produced by any acute irritation of the small intestine, are frequently seen after catharsis. This patient was operated on two days later and found to have no organic disease of the small intestine.

Chronic Ileitis.—Our study of the diagnostic problems presented by regional ileitis in its chronic ulcerative and cicatrizing stages also was limited to cases in which the diagnosis was proved by laparotomy.

A review of the symptoms in 107 cases revealed the following incidence of important symptoms: pain, 92 cases; malnutrition with weight loss, 80 cases; fever, 65 cases; diarrhea, 60 cases; external fistula, 23 cases; abdominal mass, 40 cases, and anemia, 42 cases. The most important symptom in directing attention to the intestinal tract was pain; diarrhea was next.

A complete diagnosis in cases of chronic enteritis includes a determination of the location and extent of the disease, as well as its complications, which involve intestinal obstruction and perforations resulting in internal or external fistulas or abscesses. This information usually can be obtained by roentgenologic studies of the small intestine by barium meal and by the injection of external fistulas with iodinized oil. These signs frequently are extensive and easily recognized, but from the standpoint of broadening the range of roentgenologic diagnosis the proved cases with minimal findings are of special interest.

From the Department of Gastro-Enterology, the Lahey Clinic.
Read before the Section on Gastro-Enterology and Proctology at the Ninety-Fourth Annual Session of the American Medical Association, Chicago, June 15, 1944.

1. Crohn, B. B.; Ginzburg, L., and Oppenheimer, G.: Regional Ileitis: A Pathologic and Clinical Entity, J. A. M. A. **99**: 1323-1329 (Oct. 15) 1932.

Figure 3 is a roentgenogram of a patient who presented only mild and unimpressive symptoms which consisted of bouts of mild abdominal pain. The findings here are certainly minimal, and if the stringlike appearance of the terminal ileum had not been constant in other roentgenograms it might easily have been

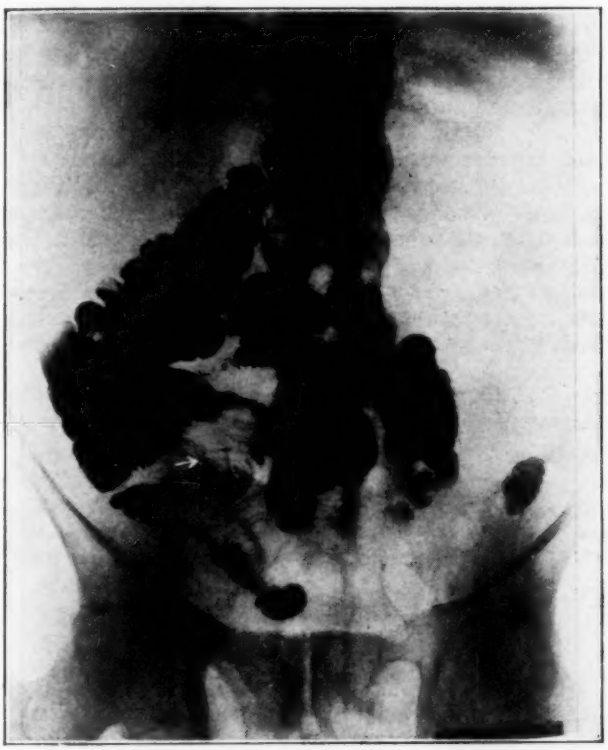

Fig. 1.—Five hours after a barium meal: hypermotility in the small bowel, separation of the loops of the terminal ileum, long segments of pronounced spasm and irregularities of the mucosal pattern. Diagnosis, early acute ileitis.

considered nondiagnostic. However, at laparotomy there was a definite nonobstructing ileitis involving the terminal 12 inches of small intestine, which demonstrates the diagnostic importance of even slight variations from the normal pattern, provided the distortions are constant in serial roentgenograms.

When partial or complete obstruction of the small intestine develops as a complication of regional ileitis, the abdominal symptoms become more severe and the roentgenologic signs of disease are more striking. Stasis and dilatation of the small bowel are the outstanding features and may be quite pronounced without demonstrating any special characteristics that identify the nature of the obstructing lesion. For example, figure 4 shows considerable obstruction and dilatation of the ileac loops but no changes in the small intestine that are characteristic of chronic inflammation. The diagnosis of ileitis in such a case depends on the clinical features and often cannot be definite.

If, on the other hand, dilated loops of the small intestine are accompanied by distal areas of characteristic narrowing and rigidity (fig. 5), the diagnosis of chronic cicatrizing enteritis with obstruction is quite certain.

Another complication which influences the clinical picture, prognosis and plans for treatment is chronic perforation with external and internal fistulas and abscess formation. This complication usually produces striking roentgenologic effects which may be either confusing or enlightening.

Fistula formation is so characteristic of chronic ileitis that the finding of an internal or external tract connecting with the small intestine is strong presumptive evidence of ileitis. If, in addition, there are loops of small bowel showing the typical changes of chronic inflammatory disease, the diagnosis is on a sound basis. In figure 6 the ileum shows extensive typical deformity with multiple internal fistulas between the diseased portion of the small intestine and the colon. This patient also had external fistulas.

TREATMENT

The management of chronic ulcerative enteritis depends on the following factors:

1. Stage of morbid process.
2. Location and extent of involvement in the small intestine.
3. Activity of the inflammatory, ulcerative and cicatrizing process.
4. Complications.

This disease has a profound tendency to run a chronic, slowly progressive course for an indefinite period. Although clinical remissions are fairly common, and in certain instances the morbid process appears to be permanently arrested, most cases tend to follow a relentless course with symptoms due to the persistent hyperplastic intestinal lesions and the formation of obstructive granulomas and perforations into adjacent regions.

Fig. 2.—Four hours after a barium meal: segmentation of barium in uniform sized masses, no rigidity or constancy in shape, and no string sign. Diagnosis, no organic disease; irritation of the ileum.

Experience in the treatment of chronic regional enteritis has proved that in properly selected cases surgical measures are successful and satisfactory. Marshall [2] has described the surgical measures employed in this series and has reported the clinical results.

2. Marshall, S. F.: Regional Ileitis: Surgical Management and Results of Operation, S. Clin. North America **23**: 873-880 (June) 1943.

The selection of the type of management for cases of regional ileitis may be somewhat simplified by the classification of cases into clinical groups, as follows:

1. Early acute enteritis without complications.
2. Chronic terminal ileitis without complications.
3. Chronic terminal ileitis with complications (obstruction or perforation).
4. Extensive segmental ileojejunitis without complications.
5. Extensive segmental ileojejunitis with complications.

In an effort to formulate a policy in the management of this condition, our cases were separated according to this classification, and the clinical results of the various forms of therapy tabulated for each group.

1. *Eleven Cases of Early Acute Enteritis Without Complications.*—No patient in this group was treated surgically except for abdominal exploration with or without appendectomy. There was one hospital death two weeks after admission due to fulminating terminal ileitis with multiple perforations and peritonitis. Another patient died three months after exploration, but the cause of death is unknown. Of the remaining 9 patients, 4 have been well for over a year, and recent roentgenograms in 3 show little or no variations from normal. Four patients have had a recurrence of the disease and have required surgical resection of the ileocecal region with ileocolostomy. A fifth patient has roentgenologic evidence of progressive ileitis, but this has not been proved by operation.

Fig. 3.—Five hours after a barium meal: hypermotility of small intestine and a contracted stringlike terminal ileum which was also present in other films. Diagnosis, terminal ileitis.

Conclusions.—In this group operative treatment is best deferred, since approximately two fifths of the cases clear up satisfactorily without surgery. Also the limits of the disease become more clearly defined in the more chronic stage, which aids in deciding on the extent of the surgical resection.

2. *Eighteen Cases of Chronic Terminal Ileitis Without Complications.*—Four of these 18 patients had recurrent terminal ileitis after an operation performed elsewhere. Eight patients were treated by a medical regimen,[3] with satisfactory results in 4 cases. In 1 case no follow-up information is available. Three patients had persistent symptoms, which required subsequent surgical resection in 2.

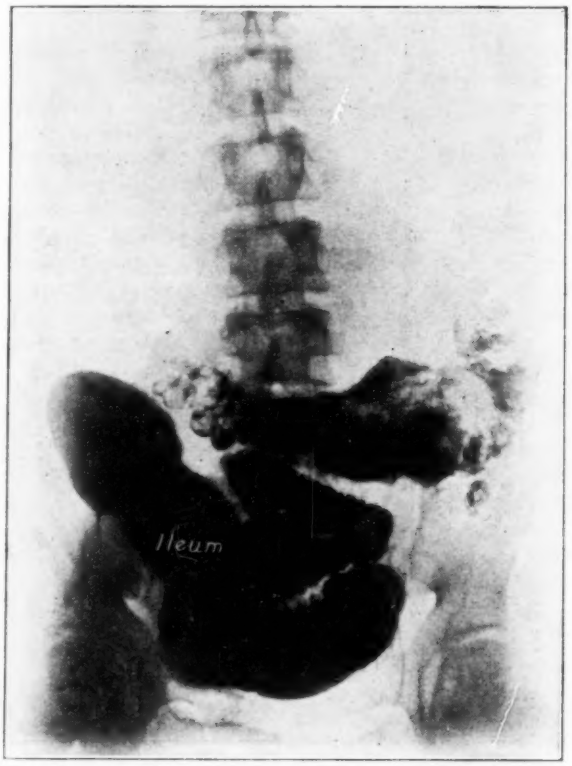

Fig. 4.—Six hours after a barium meal: stasis in a much dilated ileum. The nature of the obstruction is not clearly shown. Diagnosis, chronic ileac obstruction, possibly terminal ileitis.

A total of 12 patients were operated on, resection of the diseased portion of the ileum and proximal colon with ileocolostomy being done. There were no deaths. In 11 cases the results are satisfactory, with follow-up data covering a period of from six months to five years. One patient has roentgenologic and clinical evidence of recurrent ileitis proximal to the ileocolostomy, but this has not been proved by laparotomy.

Conclusions.—In cases in which the disease is relatively mild, a medical regimen should be given a trial with the hope that a prolonged remission will result or the morbid process will become arrested before serious damage is done. Probably in not more than half of the cases treated in this way will the results be satisfactory. In a majority of these cases surgery is necessary, and, as far as can be concluded from a small group, resection of the diseased ileum and the ascending colon is a safe procedure and yields satisfactory results in a large proportion of cases.

3. *Fifty-Six Cases of Chronic Terminal Ileitis With Complications.*—In 31 of the 56 cases in this group, the complication was obstruction, and in 27 it was perforation, with or without obstruction. Fourteen

3. There is no specific medical treatment for regional ileitis. The medical management referred to consists mainly in general supportive measures, which include bed rest for varied periods of time, usually several weeks. The diets used were bland and low in roughage, without cold foods or drinks. The protein content of the diet was maintained at a high level. Supplemental vitamins were used in moderately large doses over long periods of time. Ferrous sulfate was used for anemia. Transfusions were given when the hemoglobin or plasma proteins were low. The sulfonamides were tried in a few cases without any definite evidence of benefit.

patients were tried on a medical regimen, with the addition of simple drainage of an abscess in 1 case. Of these, no follow-up information is available in 2 cases. Three patients obtained satisfactory results. Nine patients later came to operation for resection of the ileum and right colon (8 performed in the clinic and 1 elsewhere).

Six patients had an ileocolostomy without resection of any intestine. In 2 of these the results were good; there was one postoperative death due to sepsis. Three patients later required resection (2 performed in the clinic and 1 elsewhere).

There were 44 resections of the ileum and right colon, including 2 cases in which an ileocolostomy was performed first. There was one postoperative death due to embolism. There were 8 recurrences after resection, proved by operation in 7 and by subsequent death from sepsis in the eighth. One other patient had clinical and roentgenologic evidence of recurrence, which was not confirmed by laparotomy. In 35 of the 44 cases of resection the results were satisfactory. In all but 7, follow-up data covered a period of over one year.

Ileostomy was performed on 2 patients, 1 of whom died postoperatively of sepsis; the other is well.

Conclusions.—1. Medical management alone has little to offer patients with chronic terminal ileitis with either complicating obstruction or perforation.

2. Ileocolostomy without resection is unsatisfactory in complicated cases except as a preliminary step to resection.

3. The operative mortality of ileo-ascending colectomy is remarkably low in the hands of an experienced surgeon.

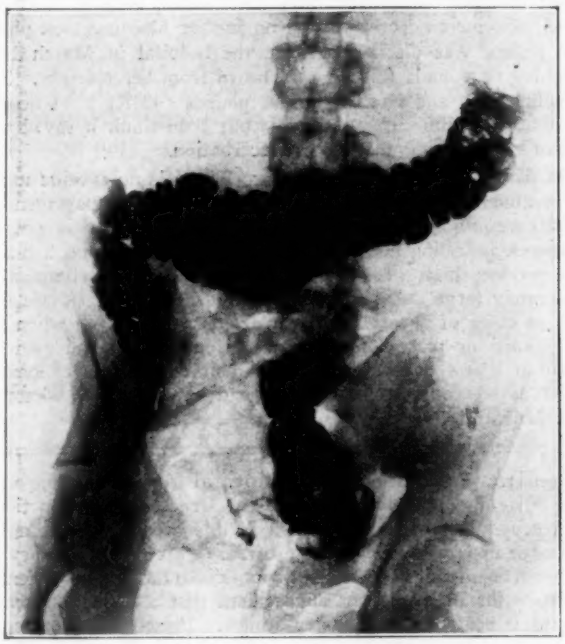

Fig. 5.—Six hours after a barium meal: delay and dilatation of the ileum above an area that is rigidly contracted and irregular in outline. Diagnosis, chronic terminal ileitis with obstruction.

4. There is a fairly high rate of recurrence of the disease even after removal of all involved areas.

4. *Eight Cases of Segmental Ileojejunitis Without Complications.*—Seven of these 8 cases were treated with a medical regimen. Although exploration was done in 3 there was no surgical treatment. Of the 7 patients, 1 is dead of malnutrition, 1 has not improved satisfactorily, 4 are improved and 1 was not followed.

The 1 patient treated surgically with resection of a large portion of the small intestine developed recurrent enteritis and died.

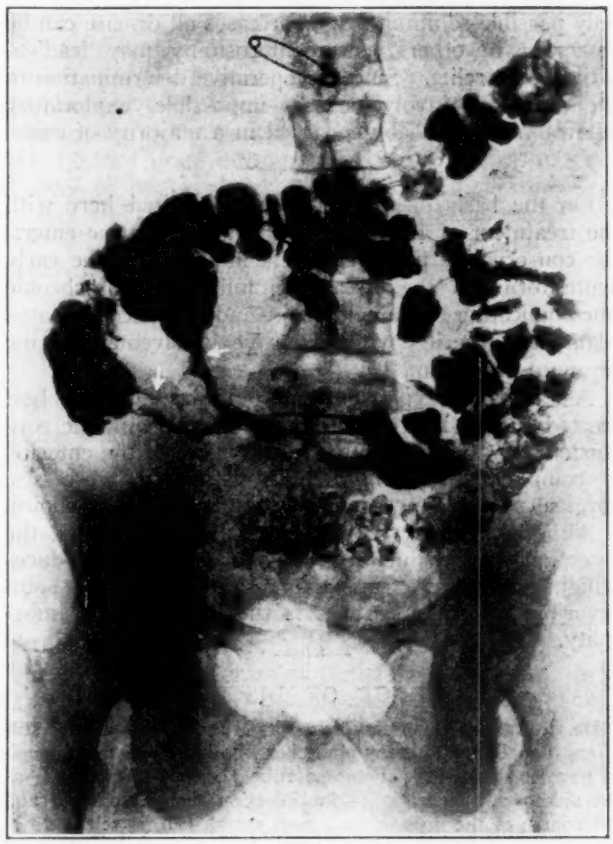

Fig. 6.—Four hours after a barium meal: extensive involvement of the ileum with narrowing, loss of flexibility and irregularities of mucosal pattern combined with multiple fistulous tracts between the ileum and the colon. Diagnosis, chronic terminal ileitis with internal fistula.

Comment.—Surgical treatment in cases of segmental enteritis presents a more difficult problem, particularly when the enteritis is widespread and involves so much of the small intestine that it cannot be eradicated completely without jeopardizing the absorptive function. Experience has shown that, if all inflamed loops of small bowel are not removed, recurrence or inadequate control of the disease is the result. Medical treatment can scarcely be expected to effect a cure, but most patients can be improved and in some instances the active disease appears to become arrested. Altogether the management of extensive segmental enteritis is less satisfactory than the treatment of localized terminal ileitis.

5. *Nine Cases of Segmental Ileojejunitis With Complications.*—In 7 of these 9 cases the complication was obstruction, and in 2 it was chronic perforation with abscess. Two patients were treated for a trial period on a medical regimen, but both came to operation. Including those patients who were operated on without trial medical treatment, 9 were treated surgically. Included in the surgical cases are 6 in whom resection of the diseased area was performed with end to end anastomosis. The clinical results were satisfactory in 5 cases, with follow-up for more than a year in all but 1. The sixth patient is improved but shows clinical and roentgenologic evidence of recurrence of enter-

itis which has not been confirmed by operation. In 3 cases the surgical measures consisted of enteroenterostomy without resection, with clinically satisfactory results. There were no postoperative deaths in groups 4 and 5.

When complications are present, surgery offers the only possible solution. In some cases all disease can be resected; in others, enteroenterostomy may lead to satisfactory relief. Since preoperative determination of the extent of involvement is impossible, exploratory laparotomy is probably justified in a majority of cases.

COMMENT

On the basis of the experience reported here with the treatment of 102 cases of chronic ulcerative enteritis, conservative management is indicated in the early acute forms of the disease, in mild cases of chronic uncomplicating terminal ileitis and in uncomplicated segmental enteritis with extensive involvement of the jejunum and ileum.

As a general rule, chronic terminal ileitis is best treated surgically. This is in agreement with the conclusions of Ginzburg and Garlock.[4] When the enteritis is complicated by obstruction, fistulas or abscesses, surgical measures are definitely the treatment of choice.

Although surgery is not successful in all cases, the resection of the inflamed loops of intestine produces a high percentage of satisfactory results. Another point favoring surgical measures is the low operative mortality.

ABSTRACT OF DISCUSSION

Dr. J. Arnold Bargen, Rochester, Minn.: This disease still offers a challenge to every physician who is unfortunate enough to have to deal with patients so afflicted, since the cause is as yet unknown, the origin of the infection remains obscure and the course of the disease, once well established, is relentless in its advance and destructive nature. Moreover, it is not at all established that we are dealing with a single disease entity. The greatest service that Drs. Kiefer and Ross's discussion has accomplished is their classification of these conditions into the various groups, from an "early acute enteritis" to "extensive segmental enteritis with complications." By so doing they have advanced our ability to study, if not actually our knowledge of this problem materially. I am not convinced that these cases are all a part of one entity. It is more logical to consider these different forms as separate entities, although I can present no clear evidence for this suggestion. It is rather an impression I have gained through a fairly large experience in the handling of similar cases. The course of the cases of extensive "segmental ileojejunitis" varies considerably from that of the typical cases of cicatrizing "terminal ileitis." Any one who has seen a considerable number of the various groups of these patients must have been confronted with the question of explaining their variable course on the basis of single or multiple entities. More recently some observers have separated some cases of sarcoidosis from groups of cases formerly laboring under the designation of regional enteritis. Localized Hodgkin's disease has occasionally been mistaken for regional enteritis. Until the question of multiple entities can be more clearly defined, we shall do well to follow the practical classification which has been offered to us. It at once separates the cases for a reasonable therapeutic approach. It is of the utmost importance to decide as early in the course of the disease as possible whether medical measures are to be employed or whether surgical resection should be undertaken. We have administered the various sulfonamide drugs, i. e. succinylsulfathiazole, sulfaguanidine and sulfathalidine, to these patients, together with other supportive measures, and the response to such a program has in some instances determined the advisability or need of surgery. I wonder if Dr. Kiefer would elaborate further on the nature of his medical regimen? I have been more successful in making the diagnosis of the lesions of the terminal ileum by retrograde barium injection instead of the barium meal studies; moreover, in the obstructive cases the risk associated with the passage of the column of barium from above is eliminated. I know that a technic suitable in the hands of one is not always the most satisfactory in the hands of others.

Dr. Henry A. Rafsky, New York: I should like to ask Dr. Kiefer what the age incidence was in his cases. My experience has been that the younger the patients the more refractory they are to either medical or surgical treatment. In the management of these cases more attention should be paid to upper respiratory diseases, especially infections of the throat, as factors in producing acute exacerbations. A girl aged 16 years was first observed in August 1942. She developed ileitis after a streptococcic infection of the throat. She responded to medical measures and was well until November 1942, when she had a recurrence of the ileitis. She was operated on at the Lenox Hill Hospital. An ileotransverse colostomy with an exclusion of the diseased loop was performed. The patient was well until May 1943, when she had a recurrence. Her symptoms steadily increased and in November 1943 she was again admitted to the hospital. A mass was palpable in the right lower quadrant and x-ray examination and proctoscopy also showed evidence of ulcerative colitis. The patient went downhill notwithstanding the various medical measures employed, including transfusions, sulfonamides and vitamin therapy. During the patient's illness a pseudomembrane could be seen in the throat and Staphylococcus aureus could always be isolated from this region. An aphthous stomatitis also was present, which showed temporary improvement with vitamin therapy. Working on the premise that the throat infection might be the source of the acute exacerbation, I gave the patient 1,000,000 units of penicillin over a period of eight days. After one slight episode of bleeding two days after the penicillin was discontinued, the patient began to show evidence of improvement. The throat infection disappeared and her appetite became ravenous, bowel movements decreased and no further bleeding took place. The patient was discharged from the hospital in March 1944 weighing 60 pounds (27 Kg.). I heard from her recently. She is feeling well and now weighs 92 pounds (42 Kg.). I do not say that penicillin cured the ileitis but I do think it saved this patient's life during the acute exacerbation.

Dr. Everett D. Kiefer, Boston: There is no specific medical treatment for regional ileitis. The medical management to which we referred consists mainly of generally supportive measures, including bed rest for varied periods of time, a bland, low residue, high protein diet and supplemental vitamins in moderately large doses over long periods. Ferrous sulfate was used in cases of anemia, and transfusions were given when the hemoglobin or plasma proteins were low. Sulfonamides were given in a few cases without any definite evidence of benefit as far as we could see. We have had no experience whatever with penicillin.

4. Ginzburg, L., and Garlock, J. H.: Regional Ileitis, Ann. Surg. **116**: 906-912 (Dec.) 1942.

Somatic Psychologic and Cultural Aspects.—The concept of aging implies a decline in the structural and functional efficiency of the organism. Used in this broadest sense, aging begins at approximately the age of 21. This may be a surprising statement, but there is both experimental and experiential evidence for it. It is not an accident that a champion nearly always is beaten by a younger athlete. Prizefighters or tennis players become champions about the age of 20. There is no doubt that the experience of the champion increases with further practice and so does his judgment; but in so extreme a need for superior performance the aging process is the winner over experience. Likewise it was found that at the age of 28 a flier may be at a definite disadvantage for extreme conditions of high speed flying and that the period of blackout after a dive lengthens from the previous five to eleven seconds.—Mittelmann, Bela: Psychosomatic Medicine and the Older Patient, from Mental Disorders in Later Life, edited by Oscar J. Kaplan, Stanford University Press, 1945.

PENICILLIN IN OTOLOGY

ITS USE IN 511 CASES OF OTITIS MEDIA AND 74 CASES OF MASTOIDITIS

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The origin, preparation and action of penicillin in medicine have been so well described in the literature that I shall not discuss these subjects. Suffice it to say that penicillin is an antibiotic of the greatest importance against certain organisms whether used locally, intramuscularly, intravenously, subcutaneously, intrathecally or by a combination of these methods.

Dosage and methods of administration have not been thoroughly standardized. Cooke and Goldring [1] showed that after intramuscular injections of penicillin the concentration in the circulating blood reached its highest level within thirty minutes. It was still moderately high at the end of one hour and fell rapidly during the second hour but often persisted at lower titer for three to four hours. They found similar results after subcutaneous injection of penicillin.

Swanson and Baker [2] used penicillin intramuscularly in 15 cases of acute otitis media and locally in the mastoid cavity following mastoidectomy with controlled drainage in 2 cases of mastoiditis with good results. They also used penicillin locally in a case of chronic otitis media when other methods of treatment had failed. The middle ear infection cleared up in eight days, but the perforation of the tympanic membrane remained. In 1 of the mastoidectomies they instilled penicillin (1,000 Oxford units per cubic centimeter) into the mastoid cavity through a rubber tube every six hours. In addition they gave penicillin intramuscularly every three hours. In the other mastoidectomy case they instilled the penicillin (250 Oxford units per cubic centimeter) into the cavity only once a day. They stopped the outer end of the tube.

The Floreys [3] advise using penicillin at three hour intervals when giving it systemically in order to maintain the proper blood level. They prefer the intramuscular route as the most practicable. They used penicillin locally in the mastoid cavity following mastoidectomy in 16 cases of acute mastoiditis and in 6 cases of acute exacerbation of chronic mastoiditis. The strength of penicillin was 250 to 500 units per cubic centimeter. It was instilled into the cavity through a short indwelling rubber tube at six hour intervals. The wound was completely closed and controlled drainage maintained. Fourteen of the acute and 5 of the chronic cases healed within ten days. There were no complications in any of their cases.

In this work I have attempted to strike a happy medium, perhaps leaning toward administering too much penicillin rather than too little. When I saw an indication or lack of complete control of the infection, as a rule I increased the frequency of the dosage rather than the size of the dose.

An instance of the use of too little appeared when I first started using penicillin locally in the mastoid cavity. I instilled it into the cavity every six hours, and when the dressings were changed the next two days the incision was not as clean as I expected to see it. After that penicillin was instilled every four hours around the clock routinely for four to seven days, depending on the appearance of the wound, the general condition of the patient and the virulence of the organism.

When using penicillin systemically I began by giving 20,000 Oxford units intramuscularly, and 10,000 units was given by the same method every three hours thereafter day and night until the tympanic membrane and postaural incision were healed.

When using penicillin locally the strength was 500 units per cubic centimeter. Ten cc. was instilled into the mastoid cavity every four hours when it was a large cavity and 5 cc. when it was small. The sodium salt of penicillin was used.

The procedure for the local use of penicillin in the mastoid cavity is as follows: After the mastoid cells and products of inflammation are thoroughly exenterated the mastoid cavity, middle ear and external auditory canal are flushed through and through with warm saline solution and then dried by suction and swabbing. The postaural incision is completely closed except for the entrance of the tube. The tube is secured in the cavity at whatever place in the incision it can lead directly to the antrum without bending.

The tube for instillation of penicillin is 10 inches in length, size 14 French, of soft flexible rubber. The inner end of the tube is placed in the antrum. The outer end of the tube extends out through the dressing to the outer surface of the bandage, where it is secured by adhesive tape. Two inches of the outer end of the tube is covered with sterile gauze, and it is cleaned with alcohol before each instillation. This flexible, soft tube can be used in the cavity even though the dura and lateral sinus are exposed, without causing trauma to either. It can be used when the lateral sinus has been opened if it is properly packed.

Penicillin was used locally for an average of 6.3 days in the cases of mastoidectomy following scarlet fever and 5.1 days in the non-scarlet fever cases, at the end of which time the tube was removed.

The postaural incisions healed by primary intention. After the first few cases the dressings were not changed for four or five days and when removed the inner layers of the dressings were soaked with penicillin and the external auditory canal and incision were completely clear of any infection. Usually the external auditory canal and mastoid cavity contained clear or blood stained penicillin.

The operative patients following scarlet fever ranged in age from 17 to 29 years, with an average age of 19.4 years. These were all males. The non-scarlet fever patients ranged in age from 1½ to 29 years. These were women and children. All of the latter patients were seen over a period of three months following operation and remained normal.

The operative patients following scarlet fever were seen by me or I had reports from them over a period of two months after operation. None of them had recurrences or further difficulty with the ears. About 10 per cent of the total number of scarlet fever patients were treated with penicillin from the onset of the disease.

This article has been released for publication by the Division of Publications of the Bureau of Medicine and Surgery of the U. S. Navy. The opinions and views set forth in this article are those of the writer and are not to be considered as reflecting the policies of the Navy Department.

1. Cooke, J. V., and Goldring, D.: The Concentration of Penicillin in Various Body Fluids During Penicillin Therapy, J. A. M. A. **127:** 80-87 (Jan. 13) 1945.
2. Swanson, C. A., and Baker, D. C., Jr.: The Use of Penicillin in Diseases of the Ear, J. A. M. A. **126:** 616-620 (Nov. 4) 1944.
3. Florey, M. E., and Florey, H. W.: General and Local Administration of Penicillin, Lancet **1:** 387-397 (March 27) 1943.

Undoubtedly the administration of penicillin from the onset of scarlet fever reduces the incidence of ear complications. In a study of 300 patients with scarlet fever in wards giving no penicillin there was an incidence of 10.9 per cent of acute otitis media, while 300 patients in wards giving penicillin to all the scarlet fever patients showed an incidence of only 5.6 per cent otitis media.

BACTERIOLOGY

It was not practical to take cultures of the discharge from the middle ears of the scarlet fever patients or of the first mastoidectomy patients, but cultures were taken from the mastoid cavities of 23 patients at operation. Eleven of these grew Streptococcus hemolyticus, 2 of

TABLE 1.—*Analysis of Ear Complications in 5,640 Cases of Scarlet Fever*

	Number of Cases	Per Cent	Average Number of Days of Scarlet Fever Prior to Onset of Complications	Average Number of Days per Patient Administration of Penicillin Prior to Complications	Organisms (4)	Sulfadiazine Resistant
Acute otitis media	511	9	6	4 (only 10% received it)	Streptococcus hemolyticus type 17	Yes
Acute mastoiditis	60	1.06	16	10		Yes
Acute mastoiditis cured without surgery	27	0.5	12	8		Yes
Mastoidectomies	33	0.56	19	11		Yes
Intracranial complications (meningitis)	2	0.03	10	0		?

TABLE 2.—*Analysis of the 511 Cases of Acute Otitis Media Treated with Penicillin*

	Number of Cases	Per Cent	Average Number of Days Treated Prior to Surgery	Average Units of Penicillin per Patient
Cured without discharging	346	67.7	2.8	224,000
Cured after onset of discharge	105	20.5	4.3	344,000
Acute mastoiditis	60	11.7	12	960,000
Acute mastoiditis cured without surgery	27	5.3	11	880,000
Mastoidectomies	33	6.4	13	1,040,000
Intracranial complications (meningitis)	2	0.39	0	

which were typed and showed type 17. It is reasonable to assume that all of these patients were infected with the same strain of organism.

Typings of the organisms cultured from the throats were done on 3,000 of these scarlet fever patients by the epidemiologist Lieut. Comdr. L. E. Eckels.[4] All of these showed Streptococcus hemolyticus type 17, a potent toxin producer and highly communicable. These organisms were resistant to sulfadiazine in in vitro studies. They grew in 125 mg. per hundred cubic centimeters of sodium sulfadiazine in solution. Over 75 per cent of the patients with scarlet fever had received sulfadiazine prophylactically from a few days to two months prior to development of the disease. This was discontinued when it was determined that the organism was resistant to the drug.

Cultures from the mastoid cavities of the 14 non-scarlet fever patients who underwent mastoidectomy grew Streptococcus hemolyticus in 4 instances, Staphylococcus aureus hemolyticus in 3 and Streptococcus hemolyticus and Hemophilus influenzae in 1.

Table 1 gives the analysis of the ear complications occurring in 5,640 cases of scarlet fever. Nine per cent developed acute otitis media, which is about the average incidence or perhaps a little lower than in the usual cases of scarlet fever treated in the routine way without chemotherapy. There were 60 cases of mastoiditis complicating this group of scarlet fever cases, giving an incidence of 1.06 per cent. There were 33 cases requiring mastoidectomy, a percentage of 0.56, and 2 cases of meningitis of otogenic origin.

All of the 511 cases of acute otitis media (table 2) treated with penicillin were complications of scarlet fever. Sixty of the cases of acute mastoiditis were in this group. Twenty-seven, or 45 per cent, of these 60 were cured by systemic treatment with penicillin and did not require surgery. Thirty-three, or 55 per cent, required mastoidectomy. The method of treatment was with penicillin 10,000 Oxford units intramuscularly every three hours night and day. No local treatment was given to the ear other than dry wipes three times a day if discharging and hot saline irrigations for pain. Penicillin was started the instant otitis media was recognized, whether or not the middle ear was discharging. The criteria for a diagnosis of otitis media were pain in the ear, reduction of hearing and the objective findings varying in degree from redness of the tympanic membrane and malleus to bulging and discharge of pus.

Not a single patient had paracentesis. I advise this procedure ordinarily, but conditions were such that it was impossible to do it. As a good surgical principle I definitely advise incision and drainage when there is pent up pus in the middle ear.

There were pronounced and rapid pathologic changes in the structures of the middle ear in these cases, as is usually found in scarlet fever. I had the opportunity of observing hourly changes in the appearance of the tympanic membrane and general condition of 50 of these patients under treatment with penicillin. Some of the tympanic membranes were definitely bulging, discolored and almost black in appearance and in a few hours showed signs of resolving, with return to normal within forty-eight to seventy-two hours. A few cases would clear up from the infection under treatment with penicillin only to develop otitis media again in a few days or even a week or two, but promptly cleared up when penicillin was given again. The drug was continued for two days after all physical signs of otitis media had subsided.

Table 3 gives the analysis of the 33 cases of mastoidectomy following scarlet fever. In 29 of these results were excellent. It required an average of only 8.2 days for healing of the postaural incision and an average of 7.4 days for clearing of the middle ear and healing of the tympanic membrane. This is about one third of the time usually required for these structures to heal in operative mastoiditis following scarlet fever without the use of chemotherapy. There was not a single case of chronic discharging ears following treatment of these cases.

The 2 cases of meningitis were otogenous in origin and were included in the group of 29 mastoidectomies with good results. These 2 were the only cases of intracranial complications in the entire series of ear infections and they were the only cases in which penicillin was not administered from the onset of the middle ear infection. These patients were admitted to the

4. Eckels, L. E.: Personal communication to the author.

hospital with fully developed meningitis, 1 comatose, the other semicomatose and irrational. Their initial white blood cell count in the spinal fluid was 6,000 and 5,800. Neither one had received penicillin or other chemotherapy up to this time. Mastoidectomies were done on both patients. They were given penicillin 100,000 units intravenously the first twelve hours, penicillin 15,000 units intrathecally immediately and penicillin 10,000 units intramuscularly every two hours for two days and every three hours thereafter until complete recovery. One patient was given a second dose of penicillin intrathecally on the second day after operation. Penicillin was used locally in the mastoid cavity in the usual way.

As we had no knowledge whether or not the infecting organism was sulfonamide resistant in these 2 patients, they were given sodium sulfadiazine 4 Gm. intravenously every six hours for two days. Both of them recovered consciousness rapidly and were up and about partly closed with a drain emerging from the lower end of the wound. The comparison as to healing time and hospitalization is striking, being reduced to almost a third of the time when penicillin was used. This table also shows the results of postmastoidectomy treatment with penicillin in 4 cases of chronic mastoiditis. The results in these cases were not remarkable. The postaural incision healed fairly rapidly in all 4 cases but the tympanic membrane healed promptly in only 1 case. In 1 case the discharge from the middle ear continued for three months, at which time it ceased and the tympanic membrane healed. Penicillin was used twice a day in the external auditory canal until it healed. In the other 2 cases of chronic mastoiditis a discharge from the middle ear persists three months after operation in spite of the use of penicillin in the external auditory canal.

There was not a single death in the entire series of cases.

TABLE 3.—*Analysis of the 33 Cases of Mastoidectomy Following Scarlet Fever*

	Number of Cases	Per Cent	Average Number of Days Required to Heal		Lateral Sinus Opened and Packed		Organisms Cultured from Mastoid	Total Units of Penicillin Given per Patient
			Incision	Drum	Surgical	Accidental		
Mastoidectomy results:								
Excellent	29	88	8.2	7.4	..	..	9 Streptococcus hemolyticus	835,000
Fair	4	12	22.0	20.3	1	2	2 Streptococcus hemolyticus	1,624,000
Intracranial complications (meningitis)	2	6	9.0	7.0	1	..	2 Streptococcus hemolyticus	2,215,000

TABLE 4.—*Analysis of 17 Cases of Mastoidectomy, Non-Scarlet Fever*

	Number of Cases	Duration of Otitis Media Prior to Surgery	Number of Days Penicillin Was Administered		Average Number of Days Required to Heal		Organisms Cultured from Mastoid	Number of Days of Hospitalization	Total Units of Penicillin Administered per Patient
			Locally	Intramuscularly	Incision	Drum			
Acute mastoiditis (penicillin used)	10	30 days	5.1	7	6.3	6.3	1 Hemophilus influenzae 4 Streptococcus hemolyticus	7.1	572,750
Acute mastoiditis (penicillin not used)	3	29 days	0	0	18.3	20.6	1 Streptococcus hemolyticus	17.3	0
Chronic mastoiditis (penicillin used)	4	18.4 years	7	10	9	2 healed 2 perforated	3 Staphylococcus aureus hemolyticus	10	835,000

in ten days. Cultures from the mastoids grew Streptococcus hemolyticus type 17. There was no growth on the cultures from the spinal fluid in either case. Twenty-four hours after the beginning of treatment of these 2 patients their spinal fluid showed less than 0.5 unit of penicillin per cubic centimeter of fluid.

Three of the 4 patients treated with only fair results (table 3) had their lateral sinuses opened and packed at operation. Possibly this was the reason why healing did not occur and the infection clear up sooner although penicillin was administered in the usual way. There was no obvious reason for the fourth case in this group not doing well. The postaural wound broke down on the fourth day after operation, drained pus profusely and did not heal for twenty-seven days.

Table 4 gives the analysis of 17 mastoidectomies on the patients with non-scarlet fever mastoiditis. Ten of these were operated on for acute mastoiditis and penicillin was administered in the usual way. All of them healed rapidly, requiring an average of only 6.3 days for the postaural incision and tympanic membrane to heal. Postoperative hospitalization lasted an average of 7.1 days.

Three of these patients were operated on for acute mastoiditis before I started using penicillin. The mastoid cavity was packed with iodoform gauze, the wound

Engler [5] made a survey of otitis media in scarlet fever at the Cleveland City Hospital over the ten year period from Jan. 1, 1930 to Jan. 1, 1940. During this period there were 8,229 cases of scarlet fever admitted. There

TABLE 5.—*Comparison of the Ear Complications in Engler's Survey of 8,229 Cases of Scarlet Fever and Author's Group of 5,640 Cases*

	Engler's Survey				Author's Cases			
	Number of Cases	Per Cent	Per Cent of Otitis Media Cases Requiring Mastoidectomy	Mortality, per Cent	Number of Cases	Per Cent	Per Cent of Otitis Media Cases Requiring Mastoidectomy	Mortality
Otitis media	798	9.7	19.3	3.7	511	9.0	6.4	0
Mastoiditis	154	1.9	....	5.8	60	1.06	...	0
Mastoidectomy	154	1.9	....	5.8	33	0.56	...	0
Intracranial complications	14	0.17	....	0.10	2	0.03	...	0

were 798 complications of otitis media, an incidence of 9.7 per cent; 154 cases of mastoiditis, an incidence of 1.9 per cent, and 14 cases of intracranial complications, an incidence of 0.17 per cent (table 5). In 19.3 per

5. Engler, C. W.: Otitis Media in Scarlet Fever: A Survey of Cases at Cleveland City Hospital for Past Ten Years, Ohio State M. J. **37**: 139-143 (Feb.) 1941.

cent of his 798 cases of otitis media mastoiditis developed and in 1.8 per cent intracranial complications developed. The mortality rate in his survey of otitis media cases was 3.7 per cent and in the cases of mastoiditis 5.8 per cent. The first seven years of Engler's survey period was previous to the advent of chemotherapy for ear diseases, and during this time mastoiditis developed in 20.2 per cent of the cases of otitis media, while during the last three years of his survey sulfanilamide was administered in the otitis media cases and mastoiditis developed in only 14 per cent.

Table 5 gives a comparison of the results in this series of cases I have reported with those of Engler's survey. In noting the difference in morbidity and not a death among my cases it must be realized that the incidence of ear complications following scarlet fever is greater in young children from the ages of 1 to 8 years than in adults. In his survey 76.4 per cent of all the otitis media cases were in this age group. Nevertheless to observe these sick men (and most of them were very sick) from day to day and see the pronounced and rapid improvement, one must give much credit to penicillin. I am sure that some of them would have died and the morbidity would have been much greater without its use.

SUMMARY

Penicillin was used intramuscularly in the treatment of 511 cases of scarlet fever otitis media. It cured 27 cases of scarlet fever mastoiditis without surgery. It was used intramuscularly and locally in 33 cases of scarlet fever mastoiditis requiring surgery, in 2 of which meningitis was present. It was administered by the same methods in the postoperative treatment of 14 non-scarlet fever cases of mastoiditis. Ten of these were acute and 4 were chronic. Penicillin kept the morbidity to a minimum and there were no deaths.

520 Commonwealth Avenue.

CYANOSIS IN INFANTS CAUSED BY NITRATES IN WELL WATER

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Two examples of a previously unrecognized condition which may be confused with congenital heart disease are cited in this report. The condition may occur anywhere in rural areas where well water is used in infant feeding.

REPORT OF CASES

CASE 1.—C. H., a white female baby, was born two weeks before the expected date by cesarean section because of toxemia of pregnancy, which had been severe for one month. The birth weight was 3,870 Gm. (8 pounds 8 ounces). There was no known neonatal distress. On the twelfth day after birth, when she left the hospital, she weighed 3,720 grams (8 pounds 3 ounces). The formula she was receiving at that time was evaporated milk 210 cc. and water 540 cc. with 30 Gm. of a dextrin-maltose preparation.

She was admitted to a local hospital at 18 days of age because of vomiting, excessive crying and failure to gain weight. After admission an acidified skim milk formula was substituted and, because diarrhea followed, 1 teaspoon of a kaolin-pectin powder was added to each bottle of formula. The baby was discharged at the age of 27 days, having gained 360 Gm. (12 ounces).

She was seen again because of diarrhea at 31 days of age, at which time it was suspected that she might be allergic to the milk formula. A proprietary food mixture with soy bean powder as its principal ingredient was prescribed. The formula consisted of 80 Gm. of this mixture and 840 cc. of boiled water.

Two days later, after nine to twelve hours of irritability, the infant was noticed to be decidedly cyanotic and drowsy. So alarming were the signs that the parents rushed the baby again to the local hospital. Physical examination at that time revealed no evidence of pneumonia, atelectasis or pneumothorax; the heart sounds were good and the temperature was normal. A defective oil burner was in use in the home, and although the picture was not consistent with carbon monoxide poisoning a peculiar gaseous poison producing methemoglobinemia was suspected. Preliminary treatment with oxygen for thirty minutes resulted in no change. Therefore 1 per cent methylene blue, 1.1 cc. for each kilogram of body weight, was administered under the scalp, and the local area was massaged vigorously. Within thirty minutes the color, respirations and heart rate were normal. The cyanosis did not recur in the hospital, and the baby was discharged in a week, asymptomatic and taking the soy bean formula satisfactorily.

Forty-eight hours later the baby again was taken to the hospital with similar signs, and the same treatment was employed. (This time the aforementioned oil burner had not been in use.) She was hospitalized for sixteen days and at the time of discharge weighed 4,545 grams (10 pounds), had normal stools and was taking her soy bean and water formula in a normal, healthy fashion.

Two days later the parents suspected the onset of the same condition and returned with her to the hospital. This time the signs evidently were not convincing, for the baby was not admitted or treated. The parents were assured that she was well and were told to take her home.

Much to every one's disappointment, the baby was readmitted the next day suffering the worst attack of any. Two hours were required for the methylene blue treatment to relieve her distress.

It was realized that the only significant change in the infant's environment from hospital to farm home was in the water. Sulfhemoglobinemia being a remote possibility, the water was analyzed but no sulfides were found. The water was not tested bacteriologically. Nevertheless, the parents were warned not to give any more well water, and a formula of acidified whole milk was substituted.

The infant's father was dissatisfied with this incomplete explanation and also was loath to accept the possibility that his daughter was abnormal. Therefore arrangements were made to have her admitted to the Children's Hospital of the University of Iowa. The father believed that a peculiar reaction occurred between the well water and the soy bean preparation, producing a poison which caused her distress. Hence he asked the admitting physician if it would be desirable to bring samples of the water and powdered formula to the hospital for analysis. An open minded attitude on the part of the latter in accepting this "cock and bull" theory as plausible resulted in the father's bringing the water, which yielded the answer to the problem.

Physical examination on admission to the Children's Hospital revealed no abnormalities. The urine was normal. The red blood cell count was 3.2 million, with 11 Gm. of hemoglobin. The white blood cell count was 6,750, with a normal differential count. The blood Wassermann and Kline reactions were negative. A roentgenogram of the chest showed no abnormality. An analysis of the baby's blood for methemoglobin yielded a high normal value[1] of 0.18 Gm. for each hundred cubic centimeters.

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Dr. Robert L. Jackson admitted the first patient to the Children's Hospital and gave the author the opportunity to study his patient. The second patient was admitted, and the diagnosis was made, by Dr. Julia McElhinney.

The methemoglobin determinations in the 2 cases were carried out by Mr. George Dubey Jr., research assistant in the Department of Internal Medicine, State University of Iowa, using the method of Michel and Harris (J. Lab. & Clin. Med. **25**: 445 [Feb.] 1940).

The analyses of the samples of well water were made by Dr. J. Garth Johnson, principal water analyst, State Hygienic Laboratory, Iowa State Department of Health. The nitrate determinations were carried out by means of the phenol-disulfonic acid method (Standard Methods for Examination of Water and Sewage, American Public Health Association, Lancaster, Pa., Lancaster Press, Inc., 1936, p. 48).

1. Paul, W. D., and Kemp, C. R.: Methemoglobin: A Normal Constituent of Blood, Proc. Soc. Exper. Biol. & Med. **56**: 55-56 (May) 1944.

Reports in the literature of infantile methemoglobinemia caused by bismuth subnitrate suggested that nitrates might be the causative agent in this case. It was thought that the well water might contain toxic amounts of nitrates. An analysis of the water confirmed this suspicion. An unboiled sample of water had a nitrate nitrogen value of 140 parts per million, which is equivalent to 0.619 Gm. of nitrate ion to the liter. One Gm. of potassium nitrate (saltpeter) in a liter of water approximates this nitrate ion concentration. The sample contained 0.4 mg. of nitrite ion to the liter.

A second sample of water collected from the well several days later and boiled the same length of time as that given the baby contained 0.530 Gm. of nitrate ion to the liter, which approaches the amount found in the first sample analyzed. Culture of water from the well revealed the water to be highly polluted, as an M. P. N. (most probably number of coliform organisms for each hundred cubic centimeters) of 240 was obtained. U. S. Public Health Service drinking water standards allow an M. P. N. of not more than 5.

The baby was sent home on the fifth hospital day, receiving a half-skimmed, acidified milk formula to which no water was to be added. When seen by the family physician at the age of 4 months, no evidence of any permanent central nervous system damage from cerebral anoxia was found.

CASE 2.—S. M., a white female baby, was born normally after an uneventful pregnancy. The birth weight was 3,400 Gm. (7 pounds 8 ounces). There was no neonatal distress, and she had almost regained her birth weight when she left the hospital on the ninth day after birth. A formula of evaporated milk, water and corn syrup was prescribed. The baby developed diarrhea with eight to ten loose, green stools a day but did not vomit. At 27 days of age she became "blanched out," cyanotic and drowsy and was taken to the family physician. On this day she weighed 4,140 Gm. (9 pounds 2 ounces) in her clothing. The physician informed the parents that they had a blue baby. After an adjustment of the formula was made, the baby was sent home. At 31 days of age a formula of evaporated milk 210 cc., boiled water 510 cc. and corn syrup 45 cc. was given.

Decrease in Methemoglobin Content After Administration of Methylene Blue

Sample	Time	Methemoglobin Content
1	4:30 p. m.	2.65 Gm. for each 100 cc.
2	7:20 p. m.	2.72 Gm. for each 100 cc.
3	9:10 p. m.	2.70 Gm. for each 100 cc.
	10:13 p. m.	Methylene blue
4	10:45 p. m.	0.18 Gm. for each 100 cc.
5	11:54 p. m.	0.25 Gm. for each 100 cc.
6	11 a. m. (next day)	0.22 Gm. for each 100 cc.

The cyanosis never again became so noticeable as on the twenty-seventh day after birth, but it remained obvious and caused the parents to bring the baby to the Children's Hospital at the age of 38 days. Physical examination on entry revealed that the infant was well developed and well nourished, with a moderately cyanotic skin. Crying intensified the cyanosis. The fontanel was soft. The heart rate was not rapid, and no murmur was heard. The chest was clear to percussion and auscultation. Neither the liver nor the spleen seemed enlarged. The buttocks were moderately excoriated, attesting the persistent diarrhea. Laboratory data included negative blood Wassermann and Kline reactions. The Haden-Hausser hemoglobin value was 13 Gm., the red blood cell count was 2.95 million and the white blood cell count was 10,000, with a normal differential count.

Blood samples were collected at 4.30 p. m. (just before a feeding), at 7:20 p. m. and at 9:10 p. m. At 10:13 p. m. 0.6 cc. of a 1 per cent solution of methylene blue was administered intravenously (a dosage of approximately 1.5 mg. for each kilogram of body weight). Blood samples were then collected at 10:45 p. m., at 11:45 p. m. and at 11 a. m. the next day. These were taken immediately to the laboratory, and within one-half hour in each case the quantitative determination of methemoglobin was carried out. The results are given in the table.

The first three samples of blood when drawn were of a peculiar chocolate color. One-half hour after the methylene blue was given, the blood was normal in color. The change in the infant's appearance was especially dramatic. Unfortunately, accurate measurements of pulse and respiration were not made, but two observers noted that the infant's cry and behavior were more vigorous and that the skin color was excellent.

A sample of the well water used in preparing the infant's formula had a nitrate nitrogen value of 90 parts per million, which is equivalent to 0.388 Gm. of nitrate ion to the liter. This is roughly two-thirds the amount present in case 1. The nitrite ion content was 1.314 mg. to the liter. An attempt to analyze the formula to determine the exact amount of nitrate ion contained was unsuccessful because of caramelization. It would appear that the baby ingested approximately 0.20 Gm. of nitrate ion a day, roughly equivalent to ⅓ Gm. of potassium nitrate.

The well water was tested bacteriologically and found to be as badly polluted as the well in case 1.

Samples of blood from the mother and father, both of whom drank the unboiled well water, revealed no abnormal quantities of methemoglobin.

The baby was sent home, asymptomatic, on the second hospital day and has continued to do well. No further attacks of cyanosis have occurred.

COMMENT

Since these patients were seen by us, the Iowa State Hygienic Laboratory has received from similar wells five other samples of water containing large amounts of nitrates. The analyses were made because infants who drank the water were cyanotic. Four of these five definitely became blue after formulas containing the water were given. In the fifth case an accurate history was not obtainable; the infant in question was noted to have a "rattle in the chest," and he experienced difficulty in breathing. Thus it is possible that methemoglobinemia existed alone, that true anoxemic cyanosis was present or that the two conditions coexisted. This last infant had a bad start in life and was hospitalized at the age of 10 months at the Children's Hospital because of chronic diarrhea, stomatitis, bronchitis and malnutrition. One can only speculate as to the effect of prolonged ingestion of such water by infants.

Dr. Morgan J. Foster [2] of Cedar Rapids, Iowa, states that he has seen 5 similar cases in his practice. All the infants tended to be irritable and had diarrhea. Four were treated with methylene blue, and 1 infant died before the methylene blue treatment was known. From his records he noted that all the infants were receiving diluted milk formulas and that they came from farms in southeastern Iowa.

Dr. Roland Stahr,[2] formerly of Fort Dodge, Iowa, reported 5 cases of idiopathic cyanosis at the annual meeting of the American Academy of Pediatrics in San Francisco during May 1941. All of the infants had gastrointestinal disturbances. Twin infants, 26 days old, had mild cyanosis while receiving a diluted milk formula. Because of diarrhea a dried skim milk and water mixture was given. Deep cyanosis followed within a few hours in both infants. Methemoglobinemia was proved to be the source of the cyanosis. It cannot be stated definitely that these babies received well water, but 4 of the patients lived in northern rural Iowa.

2. Personal communication to the author.

Schwartz and Rector [3] reported the occurrence of methemoglobinemia of unknown origin in an infant aged 2 weeks. This baby was receiving a diluted evaporated milk formula. Their report does not state whether or not the infant came from a farm home where well water was used, but the general picture is similar. The infant was treated effectively with methylene blue.

Members of our staff, after having learned of this condition, saw 2 babies who were cyanotic without obvious cause. Both infants improved when the well water was removed from the feedings. In retrospect it was realized that 2 other infants, both from the same family, had been seen in consultation because of a peculiar cyanosis. Checking back, it was found that they both were taking evaporated milk feedings diluted with well water. Both of them had recovered when feedings containing less well water were given.

Thus it would seem that this condition is not rare, and a discussion of certain of its aspects may be helpful:

Cyanosis is due ordinarily to the presence of unusually large amounts of reduced hemoglobin in the subpapillary venous plexuses of the skin. Conditions such as cardiac or pulmonary disease, polycythemia or occlusions of major vessels in the extremities commonly result in cyanosis.

Abnormal compounds of hemoglobin, possessing differing absorption spectrums, may impart a peculiar hue to the skin. Thus, carbon monoxide reacts with hemoglobin to form carboxyhemoglobin, which in sufficient amount produces the striking "cherry red cyanosis." Likewise, methemoglobinemia may be associated with an unusual brown-gray skin color, sufficiently different from the color of reduced hemoglobin to arouse the suspicion that the primary difficulty is not common anoxemia.

Methemoglobinemia may follow the administration of such chemicals as aniline, nitrophenol, sulfanilamide, potassium chlorate and nitrates. That nitrates may be associated with serious or fatal methemoglobinemia in infants has been realized since bismuth subnitrate first was used as a contrast medium by roentgenologists. Roe [4] in 1933 reported the death of a 1 month old infant with diarrhea who had received 0.6 Gm. of bismuth subnitrate every two hours "until the stools became black." Cyanosis occurred in twenty-four hours. Thirteen Gm. of the drug was given in forty-four hours, and despite oxygen therapy death occurred sixty hours after the drug first was given. Roe emphasized the dangers inherent in the use of this bismuth compound and recommended the use of bismuth subcarbonate in the treatment of diarrhea.

Nitrate methemoglobinemia in adults has been reported less frequently. Eusterman and Keith [5] administered ammonium nitrate orally for diuretic purposes to a large series of adults; 2 patients developed methemoglobinemia. In 1, extreme cyanosis occurred when 54 Gm. was given in eight days. These workers gave ammonium nitrate intravenously to dogs and failed to produce methemoglobinemia. They concluded that the nitrate ion was transformed to nitrite by some abnormal metabolic process present in the 2 patients, both of whom had intestinal stasis.

That the nitrite ion will bring about methemoglobinemia is well established. In the treatment of cyanide poisoning Chen, Rose and Clowes [6] showed sodium nitrite (administered intravenously) to be an effective agent for producing methemoglobinemia. Greenberg, Lester and Haggard [7] demonstrated in vitro that one molecule of a nitrite ion reacts with two molecules of hemoglobin to form methemoglobin. In acid mediums the conversion to methemoglobin occurs rapidly; in neutral or alkaline solutions the conversion is delayed.

Van den Bergh [8] in 1905 indicated that nitrites could be formed in the bowel from nitrates and that absorption of the nitrite ion was encouraged by the presence of damaged intestinal mucosa. ZoBell [9] demonstrated in vitro that many organisms commonly found in the gastrointestinal tract were capable of converting nitrates to nitrites.

Thus it would seem that the methemoglobinemia of the infants of this report was produced as the result of the ingestion of well water containing large amounts of nitrate compounds. The nitrate ion was probably converted to the nitrite ion in the intestine by bacterial action. The nitrite ion, so formed, was absorbed and reacted with hemoglobin to form methemoglobin. The amount of nitrites already present in the well water was probably of little significance.

Although the fact that the infant possesses much less oxidizable hemoglobin than the adult is probably the most important single factor in making him more susceptible to nitrate compounds, other factors may conspire to render nitrates more toxic. Thus the bacterial flora may include more nitrate converters than in the adult. Gastrointestinal disturbances in infancy are more common than in adulthood, and the delicate mucosa may be injured more easily. In the infant the high fluid turnover and more rapid circulation may favor more complete absorption of the nitrite ions from the intestine. It is possible that the nitrite ions may be more firmly bound by infantile hemoglobin (which differs from adult hemoglobin) because of immaturity of certain enzymes. Stevenson [10] has shown that carbonic anhydrase, to name one such enzyme, is present in relatively small quantities in the infant. Further, the limited excretory power of the immature kidney may favor retention of the nitrite ion.

The 2 infants who were the subjects of this report had gastrointestinal disturbances. Whether a separate cause brought about the diarrhea and vomiting in each case or whether the nitrate salts themselves or other constituents of the putrid water incited the diarrhea cannot be ascertained. Since the gastrointestinal symptoms were almost universal and in certain cases became more severe as the formulas were further diluted with the well water, it seems likely that the cause for the whole difficulty may have been in the water. It cannot, however, be stated positively that gastrointestinal disturbances always accompany this condition, as there was no such complaint by a patient seen recently.

Neither parent of the baby in case 2 had abnormal methemoglobinemia. It is clear that the nitrate intake

3. Schwartz, A. S., and Rector, E. J.: Methemoglobinemia of Unknown Origin in a Two Week Old Infant, Am. J. Dis. Child. **60**: 652-659 (Sept.) 1940.

4. Roe, H. E.: Methemoglobinemia Following the Administration of Bismuth Subnitrate: Report of a Fatal Case, J. A. M. A. **101**: 352-354 (July 29) 1933.

5. Eusterman, G. B., and Keith, N. M.: Transient Methemoglobinemia Following Administration of Ammonium Nitrate, M. Clin. North America **12**: 1489-1496 (May) 1929.

6. Chen, K. K.; Rose, C. L., and Clowes, G. H. A.: Comparative Values of Several Antidotes in Cyanide Poisoning, Am. J. M. Sc. **188**: 767-781 (Dec.) 1934.

7. Greenberg, L. A.; Lester, D., and Haggard, H. W.: The Reaction of Hemoglobin with Nitrite, J. Biol. Chem. **151**: 665-673 (Dec.) 1943.

8. van den Bergh, A. A. H.: Enterogene Cyanose, Deutsches Arch. f. klin. Med. **83**: 86-106 (May 18) 1905.

9. ZoBell, C. E.: Factors Influencing the Reduction of Nitrates and Nitrites by Bacteria in Semisolid Media, J. Bact. **24**: 273-281 (Oct.) 1932.

10. Stevenson, S. S.: Carbonic Anhydrase in Newborn Infants, J. Clin. Investigation **22**: 403-409 (May) 1943.

was too low for a significant amount of hemoglobin to become converted. A minimal degree of methemoglobinemia is physiologic [1] and its reduction to hemoglobin is probably a continuous process. With intermittent, relatively low dosage a clinically detectable level could hardly be built up in the adults, whereas in the infant a relatively large, constant and regularly timed intake may, under certain circumstances, build up a fatal level.

Wendel [11] in 1939 studied the effect of methylene blue in the sodium nitrite-induced methemoglobinemia of dogs. At his suggestion Hartmann and his associates [12] used the dye in the prophylaxis and therapy of sulfanilamide-induced methemoglobinemia. These workers showed that a single intravenous dose of from 1 to 2 mg. for each kilogram of body weight would rapidly clear the cyanosis. Sixty-five to 130 mg. of the dye for each kilogram of body weight given every four hours by mouth would prevent the cyanosis of sulfanilamide administration. They warned that occasionally vomiting, diarrhea, headache and tinnitus occurred when methylene blue was given by mouth. Perivenous infiltration may lead to painful induration or even to necrosis. No serious reactions were encountered.

The mechanism of action of methylene blue in effecting the rapid transformation is not clearly understood. Paradoxically, in high concentration it oxidizes the ferrous iron of reduced hemoglobin to the ferric iron of methemoglobin, as do nitrites. This function has been used in the treatment of cyanide poisoning. In lower concentrations the drug seems to catalyze the physiologic reduction of methemoglobin by the body. It has been suggested by Wendel [11] that the leuko- or reduced form of the dye is formed in the erythrocytes and other body cells by certain cellular enzymes. This form may then act catalytically to promote the reduction of methemoglobin.

The high nitrate water which the cyanotic infants ingested came from very undesirable wells. In many cases the wells were old, dug rather than drilled, had inadequate casings or none at all, and were poorly covered so that surface water, animal excreta and other objectionable material could enter freely. In every one of the instances in which cyanosis developed in infants the wells were situated near barnyards and pit privies. Some of the wells had trees growing nearby, and the roots had penetrated or broken down the casings. In four of the five the water was highly contaminated with coliform organisms, but in the fifth case the water was bacteriologically safe for drinking purposes. This point serves to emphasize the fact that a well may be acceptable with respect to bacterial content and yet be potentially dangerous for use in infant feeding. It is not difficult to visualize how such a situation may arise: water seeping from barnyards and privy pits, heavily laden with bacteria and dissolved nitrogenous materials, becomes increasingly purified by passage through the soil. Certain soil bacteria have the power to oxidize ammonia and other nitrogen compounds to nitrates. The solution of nitrates so formed, rendered free from coliform organisms by the competitive growth of the hardy soil bacteria, may then enter subsurface water channels leading directly into wells used for drinking purposes. In periods of low water table the passage of the water through the earth may be slower. This slow passage may allow more nitrate to be leached from the soil and become concentrated in the wells until toxic amounts are present.

The nitrate content of water taken from wells in Iowa varied from zero to 125 parts per million (as nitrate nitrogen) in a survey made of 2,000 samples taken from domestic and municipal wells in 1934 and 1935.[13] The highest nitrate nitrogen content on record in the State Hygienic Laboratory is 567 parts per million.[14] The nitrate nitrogen of the water given to the infants varied from 64 to 140 parts per million, and the severity of symptoms seemed to parallel roughly the amount of nitrate present. Although no definite statement can be made, it would seem advisable to recommend that well water used in infant feeding possess a nitrate content no higher than 10 or, at the most, 20 parts per million.

Since Jan. 1, 1945, of 91 samples of water from dug wells sent for routine analysis by their owners 18, or roughly 20 per cent, had nitrate nitrogen values above 65 parts per million. These waters might be seriously toxic to infants if fed in any appreciable amounts. Fifty-one samples, or 56 per cent, contained amounts of nitrate greater than 10 parts per million.[14]

This, doubtless, is not a fair sampling of the domestic wells in Iowa, as all the water was sent in because, for one reason or another, its purity was doubted. It does serve to show, however, the frequency with which high nitrate values will be found if the water is suspected for any of the usual reasons.

All but one of the wells with high nitrate water were dug wells, most of which probably had defective casings. All but one of the samples of water causing symptoms in infants came from similar wells. In the latter exception the well was drilled but the condition of the casing was in doubt.

The bacteriologic data accumulated from these wells are typical of those commonly found. From 75 to 77 per cent of the privately owned wells in Iowa are contaminated, as evidenced by the presence of large numbers of coliform organisms.[15]

From the foregoing discussion it is obvious that artificial feeding of the farm baby is fraught with potential danger, and it serves to emphasize the desirability of breast feeding whenever possible. Certainly, in view of the deplorable condition of most wells, the physician should make inquiry regarding the source of water which the infant will receive. (A valuable booklet setting forth the sanitary standards for hand-pumped wells is obtainable.[16]) That all such drinking water should be boiled is clear. However, it must be understood that even boiling the water may not render it safe. If the source is under suspicion, the physician will do well to prescribe a formula containing relatively little water. Thus, a diluted whole milk feeding would be preferable to a diluted evaporated milk mixture. A dried milk and water formula would be most dangerous, whereas an acidified, boiled, undiluted milk feeding would provide the greatest possible margin of safety.

11. Wendel, W. B.: The Control of Methemoglobinemia with Methylene Blue, J. Clin. Investigation **18**: 179-185 (March) 1939.
12. Hartmann, A. F.; Perley, A. M., and Barrett, H. L.: A Study of Some of the Physiological Effects of Sulfanilamide: II. Methemoglobin Formation and Its Control, J. Clin. Investigation **17**: 699-710 (Nov.) 1938.
13. Mineral Analysis of the Underground Waters of Iowa, Des Moines, Iowa State Planning Board, 1938.
14. Personal communication to the author.
15. Biennial Reports of the Iowa State Department of Health, 1944, to be published.
16. Sanitary Standards for Hand Pumped Wells, Bulletin of Iowa State Department of Health, November 1942.

SUMMARY

Cyanosis due to methemoglobinemia may occur in infants with gastrointestinal disturbances who receive boiled water which comes from poorly constructed dug or drilled farmyard wells with defective casings. The water may contain large amounts of nitrate compounds which, when ingested, are converted by bacterial action to nitrites. The nitrite ion is absorbed and oxidizes hemoglobin to methemoglobin.

The intravenous administration of methylene blue in the dosage of 1 to 2 mg. for each kilogram of body weight promptly relieves the infant's cyanosis and distress.

The condition is not rare. Ample opportunity for its frequent occurrence exists. The condition may occur in any degree of severity, either acutely, subacutely or chronically. It may possibly lead to a fatal outcome. In all probability certain instances are incorrectly interpreted as being due to congenital heart disease.[17]

LESIONS OF SMALL INTESTINE PRODUCING MASSIVE HEMORRHAGE

WITH SYMPTOMS SIMULATING PEPTIC ULCER

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AND
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Neither pronounced melena alone nor pain alone caused by lesions in the jejunum or ileum is too unusual. There are many such reports in the literature. However, the combination of these two symptoms presenting a picture simulating peptic ulcer but produced by pathologic conditions in the small intestine beyond the duodenum has not been emphasized in the literature. Articles by Dudley [1] and Klingenstein [2] are the only two we noted that stressed such a syndrome. Thus, it seems of value to report our experience with this combination of melena and postprandial pain due to lesions of the small intestine beyond the duodenum even though our cases have been few in number.

During the past two years we have encountered 3 such patients. Two of these patients had repeated hospital admissions, at which times they were treated medically for bleeding duodenal ulcer. The third patient had only one hospital admission and was suspected at first of having a bleeding peptic ulcer. All of these patients were operated on and each was found to have a lesion of the small intestine as the cause of the massive hemorrhage and the symptoms simulating those of peptic ulcer.

17. Since this article was submitted for publication an intensely cyanotic infant was admitted to the Children's Hospital. Because he seemed to be in no particular distress, the methylene blue treatment was withheld. Twenty-four hours after the well water feedings were stopped the baby's color was normal.

Read before the Section on Gastro-Enterology and Proctology at the Ninety-Fourth Annual Session of the American Medical Association, Chicago, June 15, 1944.

From the Department of Medicine of the Genesee Hospital and the Departments of Medicine and Surgery of the Strong Memorial and Rochester Municipal Hospitals of the University of Rochester School of Medicine and Dentistry.

1. Dudley, H. D.: Vascular Tumors of the Small Intestine with Symptoms Simulating Peptic Ulcer, S. Clin. North America **14**: 1331-1337, 1934.

2. Klingenstein, Percy: Benign Neoplasms of the Small Intestine Complicated by Severe Hemorrhage: Report of Two Cases; Operative Intervention and Recovery, J. Mount Sinai Hosp. **4**: 972-979, 1938.

REPORT OF CASES

CASE 1.—A. R., a woman aged 49, seen at the Genesee Hospital in 1940, had had an appendectomy and a right tubal pregnancy. The first episode of tarry stools occurred in 1932, at which time a gastrointestinal series showed an inconstant irregularity in the duodenal bulb, and the oral cholecystogram revealed a calculus in the gallbladder. The diagnosis was duodenal ulcer with hemorrhage and the patient was placed on an ulcer regimen. Following this admission the patient had six more hospital admissions, four of which were for episodes of severe melena with pronounced anemia. The stools varied from reddish to a tarry color. The patient also complained of postprandial epigastric distress. She was placed on an ulcer regimen for each one of these episodes, with apparent improvement. Surgery was advised but refused. Blood findings during episodes were as low as hemoglobin 4 Gm. and red blood cells 1,728,000. Gastric analysis shortly after hemorrhage

Fig. 1 (case 1).—Sections of carcinoid tumor of the jejunum: *a*, intact mucosa and submucosa with the carcinoid cells in the muscularis layer; *b*, higher magnification of the carcinoid cells in the muscularis layer. The sections are slightly reduced from photomicrographs with a magnification (*a*) of 100 diameters and (*b*) of 430 diameters.

revealed: Fasting, no free acid; one-half hour after alcohol, free acid 28 units, total acid 38 units. During normal interval: fasting, free acid 20 units, total acid 36 units; one hour after alcohol, free acid 35 units, total acid 89 units. The last admission was in 1940 for gastric surgery, the preoperative diagnosis being duodenal ulcer. Operation was performed by Dr. F. N. Zuck, who described the findings as a mass in the jejunum the size of a large plum, with an ulcerated area on its intraluminal surface. A large adjacent mass of infiltrated lymph nodes was present. The gallbladder was surrounded by dense fibrous adhesions which bound the gallbladder to the pylorus and first portion of the duodenum. Two large marble sized calculi were palpated. The stomach and duodenum appeared normal. The mass was resected and an end to end anastomosis was performed. Microscopic examination showed this tumor to be a carcinoid with infiltration into the adjacent lymph nodes (fig. 1).

The patient was readmitted to the hospital in 1942 because of gallbladder pain. A cholecystectomy was performed and many adhesions were found in the abdomen at the site of the previous operation. No evidence of recurrence or metastases was present.

This woman was seen over a period of eight years for repeated episodes of severe gastrointestinal bleeding with postprandial pains simulating those of peptic ulcer. The gastrointestinal series showed an inconstant irregularity in the duodenal cap. With such a syndrome plus the roentgenologic findings the most logical diagnosis seemed to be duodenal ulcer with repeated episodes of hemorrhage. The findings proved to be a carcinoid of the jejunum. The irregularity in the duodenal cap was caused by adhesions from the diseased gallbladder.

If a Levine tube had been passed during the acute episode of bleeding and had failed to reveal evidence of gross bleeding, the finger of suspicion might have moved away from duodenal ulcer. Close analysis of the postprandial pains did not show them to be typical. However, duodenal ulcers, especially in women, do not always provide typical symptoms. The other confusing element was the presence of gallbladder disease. Gastric analysis was not of value—it was low in the anemic period but high in the interval.

CASE 2.—R. G., a man aged 52, seen at the Strong Memorial and the Rochester Municipal hospitals in 1941, had had pulmonary tuberculosis, for which a left apical paraffin pack had been performed. The first admission to the Rochester Municipal Hospital was in November 1941. The patient's history was that of an ulcer since 1940 with two previous episodes of bleeding. He had definite postprandial pains relieved by food. Diagnosis at this time was duodenal ulcer with bleeding; old pulmonary tuberculosis. Blood examination revealed hemoglobin 5.5 Gm., red blood cells 1,810,000, white blood cells 9,600, nonprotein nitrogen 39 mg. per hundred cubic centimeters. The stools became negative for occult blood. The gastrointestinal series revealed the stomach and duodenal cap to be normal. The upper portion of the jejunum on the first roentgenologic examination showed a constricted area which suggested some type of lesion. This area was reexamined and the defect could not be demonstrated. On Jan. 21, 1942 a recheck gastrointestinal series revealed some narrowing of the duodenal cap, which was interpreted as probably a healed duodenal ulcer. The lesion previously seen in the small intestine was not noticed. On Feb. 13, 1943 the patient was readmitted to the Strong Memorial Hospital because of weakness and the presence of tarry stools. Pains were no longer relieved by food, and a 5 pound (2.3 Kg.) weight loss had occurred. The gastrointestinal series showed no lesion in the duodenum. Gastric analysis Feb. 20, 1943 revealed no free hydrochloric acid after alcohol. On this admission the diagnosis of duodenal ulcer was discarded and suspicion was directed to gastritis, Meckel's diverticulum or a lesion of the small intestine. Symptoms simulating duodenal obstruction developed and the gastrointestinal series on March 25 revealed a filling defect in the upper jejunum just beyond the duodenojejunal flexure (fig. 2). This was present in the same location as previously noted in 1941. The impression now was an intrinsic lesion of the upper jejunum which might be carcinoma. Operation was performed by one of us (W. J. M. S.) on May 5. A mass the size of an orange which extended into the mesentery was present in the first part of the jejunum. This mass was firm and nodular and appeared malignant. The tumor with the adjacent jejunum and mesentery was removed and an end to end anastomosis was performed. Microscopic diagnosis was carcinoma of the jejunum with invasion of the lymph nodes (fig. 3). Symptoms of obstruction occurred in August, and exploration on September 14 revealed the jejunum to be rotated and twisted by an inoperable mass. The adhesions were divided, resulting in release of this partial obstruction.

Fig. 2 (case 2).—Constricted area in the upper jejunum produced by the carcinoma.

This represents another instance of repeated episodes of gastrointestinal hemorrhage and postprandial pains simulating peptic ulcer. The patient had repeated hospital admissions over a period of two years because of the recurrence of massive bleeding, at which times he was treated medically for duodenal ulcer with bleeding. Eventually he developed symptoms of obstruction, which still could have fitted the picture of a duodenal ulcer which had become obstructed. A gastric analysis showed no free hydrochloric acid, and it was then realized that the man had some lesion other than duodenal ulcer. The final gastrointestinal series definitely showed a constricting lesion in the jejunum near the duodenojejunal flexure area, and the diagnosis was changed to possible carcinoma of the jejunum.

The original gastrointestinal series in 1941 showed some changes in the same part of the jejunum, which unfortunately was not demonstrable in a recheck roentgenologic examination. If at that time a gastric

analysis had been done it might have shown no free hydrochloric and might have made one aware that a peptic ulcer was not responsible for this syndrome. This might have led to an exploration at the first

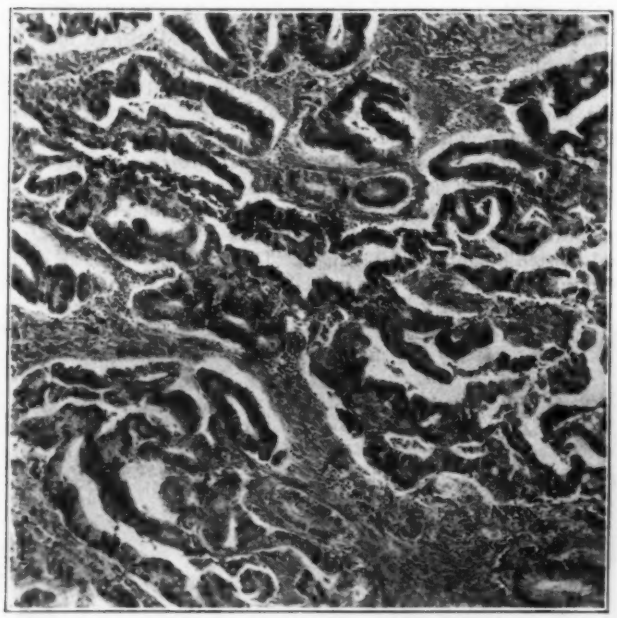

Fig. 3 (case 2).—Section of carcinoma of jejunum, reduced from a photomicrograph with a magnification of 100 diameters.

admission. Undoubtedly then there would have been a better chance for a cure. The use of a Levine tube during the bleeding episode, by failing to reveal gross blood, might also have turned the diagnosis away from duodenal ulcer.

Fig. 4. (case 3).—Section of hemangioma of ileum, reduced from a photomicrograph with a magnification of 25 diameters.

Case 3.—J. F., a man aged 23, who entered the Strong Memorial Hospital on Jan. 12, 1943, had had epigastric pains four or five weeks previous to admission; the exact relation to meals was not noticed. Two weeks before admission the patient thought he had swallowed a small fragment of glass present in his food. The day before admission he suddenly passed reddish and then tarry stools following a hearty meal. He vomited once but did not notice any blood in the vomitus. He had repeated passage of reddish and tarry stools.

Physical examination showed that he was well developed and in mild shock. Hemoglobin was 8.9 Gm., red blood cells numbered 2,670,000, white blood cells 8,700, neutrophils 82 per cent, monocytes 8 per cent, lymphocytes 10 per cent. The provisional diagnosis was duodenal ulcer with hemorrhage or possibly a bleeding ulcer in a Meckel's diverticulum. The patient was put on hourly feedings of milk with a colloidal suspension of aluminum hydroxide. Bleeding episodes continued together with some epigastric pain, noncharacteristic in type. To assist in the differential diagnosis, a gastrointestinal series was given which showed a normal stomach and duodenal

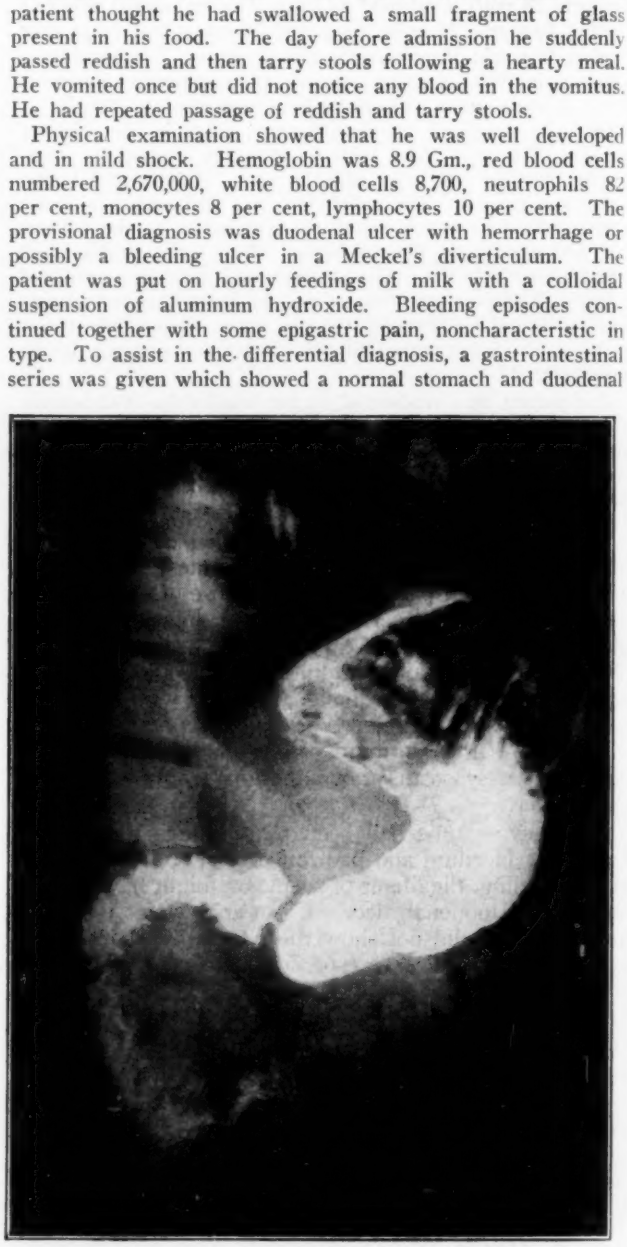

Fig. 5 (case 3).—Normal appearance of stomach and duodenal cap during episode of bleeding.

cap without evidence of any irritation or spasm (fig. 5). Because of the negative gastrointestinal series the inconclusive history and lack of definite blood in the vomitus, it was felt that the bleeding was not accounted for on the basis of a duodenal ulcer but more probably on the basis of an ulcer in a Meckel's diverticulum or an ulcerated lesion of the intestine below the duodenum. The patient continued to show evidence of blood loss in spite of repeated transfusions. His red count dropped to 1,730,000 red cells and hemoglobin to 6 Gm. The patient's prothrombin time was only 20 per cent greater than normal. His bleeding time was two minutes.

On January 23, eleven days after admission, an exploratory laparotomy was performed by one of us. His systolic blood pressure when he went to the operating room was down to 70 mm. After a large transfusion it came up to 94/60, at which time the operation was begun, while blood was given him continuously during the operation. When the abdomen was opened no gross lesion was found to account for the bleeding. The purple color of the intestinal contents could be seen in the colon and about one-half way up the small

intestine. After it had been found that the stomach and duodenum appeared normal both on inspection and on palpation and that a Meckel's diverticulum was not present, the intestine was examined inch by inch, beginning at the ileocecal valve and continuing upward to the ligament of Treitz. A nodule about 3 mm. in diameter was found in the antemesenteric border of the upper part of the ileum. A short distance above this point the purplish color of the intestinal contents stopped and the intestine showed its normal gross appearance. At first it was felt that the small nodule could be moved about 1 cm. up and down the intestine and that it probably was a polyp. At this time the musculature of the ileum was contracted. In a short time, however, the spasm of the musculature disappeared. The ileum became moderately distended and it was then seen that the nodule could not be moved. By picking up the nodule between the thumb and the first finger the lesion could be seen as a purplish spot in the mucous membrane through the thin muscular coat stretched out over the lesion. This area was excised by removing an elliptic longitudinal section about 1 cm. in length, going through all layers of the intestine. Bloody fluid, with several clots, was removed by suction from the lumen of the intestine. The lesion was revealed as a small elevation in the mucous membrane with a central ulceration about 2 mm. in diameter. Shreds of blood clot were attached to the base of the ulcer. Following the removal of the lesion the longitudinally placed incision was sewed up transversely. The only other operative findings that might be considered abnormal were: 1. There was a small purplish point seen in the small intestine a few inches above the first nodule. This also was removed. It was not ulcerated, however, and on section looked like a small lymphoid follicle. 2. The lymph glands in the mesentery of the ileum were moderately enlarged but soft. It was not felt that they were definitely pathologic, and probably this moderate hypertrophy was only due to the absorption of blood from the intestine.

In each of two microscopic sections (fig. 4) there was moderate evidence of acute and chronic inflammation in the submucosa and muscularis. In several of the recuts there was a small mass of fibrous tissue which on further sections seemed to be continuous with a fairly large blood vessel without good vessel wall, which was filled with a thrombus, most of which had undergone organization and recanalization. Many small capillaries and vessels were present in this region. It seemed most likely that this represented a large vessel which had become thrombosed with later organization and canalization. Another possibility was a small hemangioma present which bled into the tissue and this blood later became organized. Overlying this there was a small ulceration, the base of which was formed by one side of this organized hemorrhage, which was infiltrated near the surface with many acute inflammatory cells. No ulceration was seen in the other bit of tissue. No evidence of malignancy was seen.

On going over these sections carefully, however, we were convinced that this lesion represented a very small hemangioma of the mucous membrane in the ileum with ulceration of its surface. The patient's postoperative course was excellent immediately after operation. He had no further bleeding after operation. The next day, however, he developed a postoperative parotitis, which subsided under x-ray treatment but was complicated by a suppurative cervical lymphadenitis which required incision and drainage. He left the hospital on Feb. 21, 1943 and has had no further bleeding and is well.

Lesions of Small Intestine Producing Massive Hemorrhage with Symptoms Simulating Peptic Ulcer

Case	Reported by	Year Reported	Sex	Age	Pathologic Findings	Roentgenologic Findings Suggesting Peptic Ulcer	Gastric Analysis	Duration of Symptoms	No. of Episodes of Massive Hemorrhage	Comment
1	Authors.....	1944	♀	47	Carcinoma of jejunum	Occasional irregularity of duodenal bulb	Fasting HCl Free, 0 Total, 8 After alcohol Free, 28 Total, 38	8 years	5	Cholelithiasis and gallbladder adherent to first part of duodenum
2	Authors.....	1944	♂	52	Carcinoma of jejunum	Negative usually; once suggestive of narrowing of cap	No free HCl after alcohol	3 years	4	
3	Authors.....	1944	♂	22	Hemangioma of ileum	Negative	Not done	4-5 weeks	Repeated episodes in 12 day period before operation	
4	Klingenstein [2].....	1938	♂	57	Benign leiomyoma of ileum	Prepyloric spasm; small and irritable duodenal bulb	Not reported	4 years	6	
5	Klingenstein [2].....	1938	♀	29	Benign neurofibroma of jejunum	Two examinations: slight but constant prepyloric incisura; 3d examination: negative	Not reported	Indigestion since childhood	3 in 2 years	Levine tube showed no blood; string test negative
6	Joyce.....	1934	♂	19	Benign leiomyoma of ileum	Negative	Not reported	3 weeks	1	
7	Dudley [1].....	1934	♂	56	Hemangiomas throughout small intestine	Negative	Free HCl, 17.5 Total HCl, 57.6	24 years	1	
8	McKeen, R. H.: Colorado Med. **29**: 258, 1932	1932	♂	53	Meckel's diverticulum with bleeding and perforation	Persistent defect of duodenal cap	Not reported	21 days	1	
9	Mégevaud, E. C. and Dunant, Raoul: Rev. de chir. **60**: 536, 1922	1922	♂	32	Meckel's diverticulum with ulceration	Negative	Free HCl, 57	Since childhood	Numerous	

This young man's episode was mainly one of gross melena with some pains four or five weeks before admission. Because he had been under mental strain, the most likely cause was thought to be peptic ulcer with hemorrhage resulting in rapid passage of blood through the intestine. However, the gastrointestinal series was negative and repeated episodes of passage of partially red and partially tarry stools pointed away from the duodenum and to the small intestine as the cause of bleeding. The lesions in the small intestine considered were Meckel's diverticulum with peptic ulceration or some other type of small intestinal ulceration. The lesion found suggested a hemangioma. This case was managed correctly, and surgery appeared to have prevented a mortality.

COMMENT

Our primary purpose in this paper is not to discuss the differential diagnosis of massive melena in the presence of pain or to describe the various symptoms that may occur in small intestinal lesions but to emphasize the fact that lesions of the jejunum or ileum may mimic bleeding peptic ulcers.

The table summarizes our 3 cases as well as 6 other cases reported in the literature that had been diagnosed as bleeding peptic ulcer and proved to have been lesions of the jejunum or ileum as the cause of these symptoms (i. e. massive melena and postprandial pains). We wish again to stress the combination of these two symptoms, not the one or the other alone. In 6 of these cases there were roentgenologic changes in the duodenal cap which further abetted the tendency to diagnose such situations as bleeding peptic ulcers and closed the consideration of causes other than duodenal ulcer.

These 9 cases had various lesions responsible for this syndrome. There were 2 cases of benign leiomyoma, 2 of Meckel's diverticulum, 2 of hemangioma, 1 each of carcinoid, benign neurofibroma and carcinoma. We feel that other types of pathologic changes in the jejunum or ileum may cause this syndrome. However, the lesions here described are the only ones we have encountered either in the literature or in our own experience.

The importance of differentiating lesions in the small intestine from a gastric or duodenal ulcer as a cause of these symptoms is obvious. The question of immediate or eventual surgery is so different in these two types of diseases that we must avail ourselves of all possible diagnostic procedures. The use of a barium meal during active hemorrhage is not contraindicated, provided the roentgenologist is aware of the situation and does not use palpation. Case 3 in our series demonstrates the importance of the barium meal in helping to rule out the stomach and duodenum as the cause of the symptoms. After such a negative roentgenologic examination a Levine tube can be passed safely. The absence of blood in the gastric contents will help to eliminate the stomach or duodenum as a source of the bleeding.

As a result of the analysis of our cases and of those occurring in the literature, the following suggestions have shaped themselves to help differentiate lesions of the jejunum and ileum from gastroduodenal ulcers as the cause of this combination of symptoms:

1. One should be aware that small intestinal lesions may produce this syndrome.
2. The pains present are not quite as typical as those of peptic ulcer.
3. Hematemesis is usually not present.
4. The gastrointestinal series is negative for a definite ulcer, although it may be suggestive of duodenal irritability or pyloric spasm.
5. The roentgenologic study of the small intestine may occasionally show a defect, a widened loop or retained barium.
6. A Levine tube passed during the episode of melena will not reveal gross blood. (This is done after the barium meal has ruled out a gastric or esophageal lesion.)
7. A gastric analysis may show low values for hydrochloric acid.
8. The presence of a palpable mass which slides away from the fingers may suggest a lesion of the small intestine.
9. Small intestinal lesions may be present in addition to a peptic ulcer.[3]

CONCLUSIONS

The possibility of a small intestinal lesion should be considered in any patient who has repeated or continuous melena in the absence of hematemesis and in whom the pains seem somewhat atypical for peptic ulcer. Such patients should have diagnostic studies even during the active phase to help determine whether the bleeding is from the common source, peptic ulcer, or from the uncommon origin in the small intestine.

3. Smith, L. A.; Good, C. A., and Gray, H. K.: Tumor of the Small Intestine as the Cause of Recurrent Melena: Report of 2 Cases, Proc. Staff Meet., Mayo Clin. **19**: 117-122, 1944.

ABSTRACT OF DISCUSSION

DR. THOMAS E. JONES, Cleveland: I am sure that many of us have had cases of so-called unknown causes of gastrointestinal hemorrhage They are unknown because they are not fully investigated by exploratory laparotomy. I have had many cases in the past six months that might be worthy of report. A child aged 2½ years had multiple exsanguinating hemorrhages for the past year. Gastrointestinal examination was negative by x-ray. On account of my past experience with these, I advised exploratory operation. This revealed a Meckel's diverticulum with ulceration and containing typical gastric mucosa. A child aged 5½ years had multiple exsanguinating hemorrhages from the age of 7 months. Repeated examinations were negative. Always the advice given was "Well, the child may outgrow it." Examination again was negative. I advised exploratory operation and this time found a reduplication of the small intestine. This was over a length of about 8 inches in the midileum. One side of this reduplication contained normal ileal mucosa. The opposite half contained typical duodenal and gastric mucosa which was ulcerated and bleeding. A man aged 27 with multiple hemorrhages for the past seventeen years had gastrointestinal symptoms diagnosed as duodenal ulcer, and even though the x-rays were negative he was always treated for a bleeding ulcer, which was considered the most likely diagnosis. X-rays again were negative. At operation 2 feet below the ligament of Treitz was an ulcerating leiofibroma 1 inch in diameter. This was the cause of that man's trouble for the past seventeen years. These lesions in the small intestine are difficult to demonstrate by x-ray examination. The literature is full of reports of exploratory laparotomies which have been done and nothing found for these so-called "unknown" causes; however, a review of them will show that the exploration generally is made through an upper right rectus incision, the stomach and duodenum are inspected and, if negative, the hand is placed in the abdomen and the remainder of the abdomen is palpated blindly. Obviously, many small lesions will be missed. If one is going to do an exploratory operation one must visualize and palpate every bit of the gastrointestinal tract from the esophagus down to the rectum. I would make a plea for early exploratory operation in all of these cases of exsanguinating hemorrhage, even though the x-ray is constantly negative.

DR. STOCKTON KIMBALL, Buffalo: I want to corroborate Dr. Segal's findings and mention 1 patient recently observed who was of interest because he was discharged from the Army with a diagnosis of duodenal ulcer. He had some indefinite symptoms and a severe hemorrhage while in the Army. He had had, according to his report, three x-ray examinations, none of which showed any lesion. He came into our hospital with a severe hemorrhage, all rectal, with no hematemesis. His stool wasn't tarry; it wasn't bright red; it was the color of ripe, sweet cherries. X-rays during the active bleeding showed a normal stomach and duodenum. Operation showed a Meckel's diverticulum. Meckel's diverticulum is less unusual than the lesions reported by Dr. Segal and his associates but is of interest in relation to the fact that this man was discharged from the Army on the basis of bleeding ulcer, which he did not have.

Arabic Medicine.—The Arabians alone tended the lamp of the intellect in Europe during the Middle Ages. Filtered across the Pyrenees from Spain, Arabic culture was a stimulating force. The introduction of arithmetic alone was exciting (Arabic numerals made possible addition, subtraction, multiplication, division, which cannot be done with Roman numerals; the Arabs also introduced zero), but Islam's influence in medicine was deep and lasting.—Clendening, Logan: Source Book of Medical History, New York, Paul B. Hoeber, Inc., 1942.

RAPID DEVELOPMENT OF CARRIER STATE AND DETECTION OF POLIOMYELITIS VIRUS

IN STOOL NINETEEN DAYS BEFORE ONSET OF PARALYTIC DISEASE

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THOMAS FRANCIS JR., M.D.
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Well established is the fact that the virus of poliomyelitis may be demonstrated in the stools of a high percentage of cases of the disease and that in some it may be present for varying lengths of time up to several weeks [1] and even months [2] after the onset of clinical disease. Virus has been recovered from the oropharynx in approximately 50 per cent of the cases when swabs or washings were obtained within a few days of the onset of paralysis,[3] but its detection in this site is uncommon after the fifth day of disease.[4]

Presumptive evidence of the harboring of the virus for a considerable period prior to the onset of disease has been advanced by Francis and his associates,[5] who described 5 cases of poliomyelitis with three deaths following tonsillectomy in children probably carrying the virus.

Taylor and Amoss [6] demonstrated virus in nasopharyngeal washings from 2 children during a family epidemic, and in 1 of them it was present five days prior to the onset of the disease. Pearson,[7] in a study of contacts of a case, isolated virus from the stool of a child who developed fever, coryza and diarrhea eleven days following the stool collection. This was apparently an abortive case ending with an uneventful recovery.

The present report relates the discovery of virus in the stool of a boy nineteen days prior to the onset of paralytic poliomyelitis.

EPIDEMIOLOGIC INVESTIGATION

The Detroit Recreation Camp is situated about 5 miles northeast of Brighton, Mich. It is owned and operated by the city of Detroit for the benefit of underprivileged boys and girls. The camp is situated in rather open country on a small lake. The boys' camp is on one side, while that for the girls is situated on the opposite shore. There is little or no intermingling of the two sexes, except occasionally at the small cabin serving as a camp office at one end of the lake. The boys and girls swim at the same place but at different times of the day. The boys' camp consists of approximately ten cabins, a mess hall, common wash room, toilet and office. The cabins, in each of which are quartered 6 to 10 boys, including an older boy as counselor, are spaced in a row near the lake. Back of the cabins runs a road, on the other side of which are situated the common washroom, toilet, lake pump, septic tank, tennis courts and baseball diamond. The camp is clean, the toilet facilities are adequate and well taken care of. Screening is rather uniformly carried out. The dining room and kitchen are clean and well run. During the period of study the weather was hot and dry. Few flies or mosquitoes were seen or trapped.

On June 27, 1944 the camp opened its regular season and boys arrived from Detroit on that date. In one cabin, designated the Lincoln Lodge, were housed 10 boys, all between the ages of 13 and 17, who had had no previous association with one another. They were Joe K., Robert G., Ken M., Louis G., Edward L., Bob M., Dave W., Irving L., Rex M. and Richard W., the counselor. One of these, Rex M., went home on the second day of camp and another, Irving L., left July 5. Neither had been sick. Since the investigation was not undertaken until July 9, further consideration of these 2 was deemed unnecessary. Only Dave W., Robert G. and Richard W. of this group remained at camp after July 11.

Joe K. arrived at camp on June 27 and appeared normal and lively for the first day or two. On the morning of July 2 he went to church but was "mopy" later and complained of a stomach ache. He slept all afternoon. On July 3 he was apathetic but still attempted to participate in games. In the evening he was admitted to the camp infirmary with abdominal pain, headache and fever. On July 4 stiffness in the back and neck were apparent, as was pain in both thighs. He was admitted to Herman Kiefer Hospital on July 5 with the diagnosis of poliomyelitis. On August 28 weakness of both arms and paralysis of both legs were still present.

On July 9 the camp was visited and a study undertaken. In addition to 51 stools and 57 throat washings from the boys in other cabins, stool and blood specimens were obtained on 6 of the 7 boys who lived with Joe K. during his six day stay at camp, and throat washings were collected from 4 of the 7. All specimens were promptly frozen with solidified carbon dioxide.

Two of these contacts had been slightly ill on July 4, following a picnic hike. Edward L., who had been climbing actively, felt very thirsty and vomited. Later that day he complained of dizziness and a headache. The following day he still felt weak and his legs were stiff.

Bob M. complained of headache and fever but stated that he was prone to headaches. On July 5 his temperature was 100.8 F. and headache persisted. On July 6 he felt perfectly well.

Richard W. had been well until July 21, when he participated in a boat race, using his arms for paddles. That evening he thought that his arms were weak. There apparently was a very gradual progression of weakness in the upper extremities until July 28, when he was admitted to Herman Kiefer Hospital with a temperature of 100 F., pulse rate 88, respiratory rate 22. Lumbar puncture at that time showed 4 cells, all lymphocytes. The spinal fluid sugar was 80 mg. per hundred cubic centimeters and the total protein 64 mg. per hun-

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6. Taylor, E., and Amoss, H. L.: Carriage of the Virus of Poliomyelitis, with Subsequent Development of the Infection, J. Exper. Med. **26**: 745, 1917.
7. Pearson, H. E., and Rendtorff, R. C.: Studies of the Distribution of Poliomyelitis Virus: II. In a Small Town, Am. J. Hyg. **41**: 179, 1945.

dred cubic centimeters. The blood count showed 5,010,000 red blood cells, 100 per cent hemoglobin and 8,700 white blood cells, with 62 per cent polymorphonuclears, of which 54 per cent were filamented, 32 per cent lymphocytes and 6 per cent monocytes. On examination the neck showed moderate rigidity and the reflexes were hyperactive. The hands and arms were weak. He was given hot packs and physical therapy and on July 29 showed involvement of the right deltoid, right flexors of the fingers and extensors of the wrist. Weakness of the left arm had disappeared and there was improvement in the right shoulder girdle. On August 15 he was transferred to another hospital for further physical therapy. Throat washings and serum were obtained on July 29 and again a week later on August 7.

LABORATORY FINDINGS

(*a*) *Methods.*—Five of the 6 stool specimens from the boys in Lincoln Lodge were processed in the following manner: Five to 10 Gm. of stool was ground in a mortar with alundum and suspended in saline solution to make a concentration of 10 per cent. Low speed centrifugation was employed to clear the coarse particles, which were saved for intranasal inoculation. Ether to make 20 per cent by volume was added to the supernatant, and the specimens were shaken for one-half hour daily for six days. After exhaustion of the ether the material was centrifuged at 3,500 revolutions per minute for one-half hour and if bacteriologically sterile was retained for intraperitoneal inoculation. Usually 10 cc. of this material was recentrifuged in a small lusteroid tube at 3,500 revolutions per minute and used for intracerebral injection. All intraperitoneal and intracerebral specimens were adjusted to p_H 4.0 with hydrochloric acid before inoculation.

Rhesus monkeys were inoculated intracerebrally with 0.5 cc.; they were then given 10 cc. intraperitoneally and 2 cc. intranasally on the third day, another 0.5 cc. intracerebrally on the sixth day, and 10 cc. intraperitoneally and 2 cc. intranasally on the seventh or eighth day and again on the eleventh or twelfth day. Temperatures were taken at least once daily on all test animals.

The sixth stool specimen, Edward L., was made into a 10 per cent suspension in saline solution and given intranasally daily in 2 cc. quantities for ten days as suggested by Howe and Bodian.[8]

The throat washings were shaken for one-half hour on seven consecutive days with an excess of ether and after evaporation of the ether were inoculated in the same manner as the stool specimens except for the fact that the smaller quantities did not permit as many intraperitoneal inoculations.

(*b*) *Results.*—The specimen from Robert G. when inoculated into a rhesus monkey caused partial paralysis of the left leg and an extension tremor followed by definite weakness of the right leg. The diagnosis of poliomyelitis was confirmed by microscopic examination, which showed perivascular cuffing and leukocytic infiltration in both motor cortex and thalamus, infiltration of the pons and medulla, and pronounced cuffing, infiltration, neuronophagia and neuronolysis in the cervical, thoracic and lumbar regions of the spinal cord.

The monkey inoculated with the specimen of stool from David W. showed complete paralysis of both legs in twelve days. The monkey receiving the stool specimen from Louis G. showed complete paralysis of both legs after fourteen days. In both instances microscopic examination revealed definite changes typical of poliomyelitis.

Two monkeys were inoculated intranasally with the Edward L. specimen. Both showed temperatures ranging from 104 to 106 F. and persisting for about ten days, shortly followed in one by moderate weakness of both arms and partial paralysis of the left leg. Microscopic sections showed extensive perivascular cuffing and leukocytic infiltration in the thalamus and to a moderate degree in the cortex and medulla, and extensive neuronophagia, neuronolysis, cuffing and infiltration in all levels of the cord, especially in the cervical region. The second monkey showed no paralysis but was killed, and microscopic examination revealed only slight perivascular cuffing in the cortex and no changes in the cord.

No virus was recovered from the stool specimen of Bob M.

No virus could be recovered from the throat washings of Robert G., David W., Bob M. or Ken M.

Inoculations of monkey 861 with a preparation of the stool specimen obtained from Richard W. on July 9 were begun on Nov. 13, 1944. Nine days later, on November 22, weakness of the animal's left arm was observed. This progressed, accompanied by ataxia. Weakness of the left leg was apparent on November 28. Further paralysis of the limbs did not develop, and by December 4 the monkey showed signs of improvement. It was killed, and microscopic examination revealed traces of leukocytic infiltration in the pons and some neuronophagia and neuronolysis in the medulla and the cervical region of the spinal cord. A suspension of the cord and medulla was inoculated into monkey 887 on December 7. This animal showed no rise of temperature or symptoms until December 23, sixteen days later, when it was apathetic and the hair ruffled. It was found dead in the cage the following morning and an autopsy was held. Microscopic examination showed typical changes characteristic of poliomyelitis, including perivascular cuffing and infiltration of the motor cortex, infiltration of the pons, cuffing in the thalamus and moderate neuronophagia and neuronolysis in both the cervical and the lumbar cord. Cytolysis was pronounced in the latter area.

Another suspension was made from the cord and medulla of monkey 861 and inoculated into monkey 899. This monkey showed no symptoms and was discarded after six weeks' observation.

The original stool specimen, which had been maintained in the frozen state, was again prepared for inoculation, and injection of monkey 896 started on Jan. 17, 1945. Nine days later, on January 25, the animal showed definite weakness of the left arm, was irritable and ataxic. It was killed January 29 and on section showed definite perivascular cuffing and infiltration of the motor cortex and moderate neuronophagia and cytolysis of neurons in the cervical cord. The cord and medulla of this monkey were passed to monkey 927, which remained well.

The two preparations from the original human stool had been retained in the ice box at 4 C. since Oct. 16, 1944 and Jan. 4, 1945 respectively. They were inoculated into monkeys 911 and 912 on February 7. Although both animals showed temperature elevations to 104 F., no other symptoms were apparent. They were killed two weeks after the temperature rise, and

8. Howe, H. A., and Bodian, D.: The Efficiency of Intranasal Inoculation as a Means of Recovering Poliomyelitis Virus from Stools, Am. J. Hyg. **40**: 224, 1944.

microscopic examination revealed no changes characteristic of poliomyelitis.

Unfortunately no throat washings were obtained from Richard W. at the time of stool collection July 9, 1944, but fever and other symptoms were produced in monkey 898, which received washings taken on July 29, the day after the patient's admission to the hospital. The sections showed lesions typical of poliomyelitis. No virus was detected in throat washings collected one week later, August 7.

Monkeys were also inoculated individually with stools collected on July 9 from 10 boys 11 or 12 years of age in the nearest occupied cabin, two doors away, and from 2 boys who worked as "kitchen helpers." In none of these animals was evidence of illness observed.

COMMENT

An unusual opportunity has presented itself to determine not only the interval between exposure and the appearance of poliomyelitis virus in the stools of contacts but also to confirm the fact that virus may be present in the intestinal tract for some time before the onset of paralytic disease.

The probable interpretation of the results is that Joe K. arrived at camp in the incubationary stage of paralytic poliomyelitis, since the onset of his illness was five days after arrival. The occupants of the cabin had been brought together on June 27 for the first time; they were associated with Joe K. from that date until July 3. It is extremely doubtful that the brief illness of the two boys Edward L. and Bob M. on July 4 represented abortive poliomyelitis, since the incubation period would have been less than seven days. In addition, the stool of Bob M. was the only one from which virus was not recovered.

The recovery of poliomyelitis virus from the stools of 5 of 6 cabin mates collected on July 9 indicates that these boys had acquired the virus in the period of at most six days during which they were living with Joe K. This is supported by the negative tests for poliomyelitis virus in the stools of campers living in another cabin. It is apparent that multiplication of virus sufficient for the establishment of the intestinal carrier state is a very rapid process. Virus was not recovered from the throat washings of 2 of these boys at the time their stools were positive.

The second case of paralytic disease developed in 1 of the original 6 subjects nineteen days after collection of the stool specimen which was found to contain the virus. It is of interest to note that he was 1 of 3 from this group who remained at camp. No additional cases developed.

The detection of virus in this stool of Richard W. establishes the fact that virus may be present in the intestinal tract for some time before the onset of the paralytic disease. More than the usual precautions were taken to verify this finding. The original stool was processed twice and each time caused typical symptoms in monkeys. Diagnosis was corroborated by microscopic examination, which showed characteristic if not extensive involvement of the nervous tissue. In addition, passage of the cord and medulla invoked the disease, also verified by microscopic examination, in 1 of 3 monkeys. The fact that 4 other boys exposed for exactly the same period likewise had virus in their stools adds materially to the evaluation of the findings.

It is of interest that virus was recovered from the patient's throat washings on the day after hospitalization but not from washings one week later. This is in close agreement with the findings of others.[3] It may be that the presence of virus in the nasopharynx is associated only with the acute phase of the disease, while the intestinal tract is a potent source of virus before, during and for some time after the onset of clinically diagnosed poliomyelitis.

MERCURY POISONING IN TUNGSTEN-MOLYBDENUM ROD AND WIRE MANUFACTURING INDUSTRY

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In the United States at present there are five or six establishments which manufacture the bulk of tungsten, molybdenum and tungsten-molybdenum combinations used for electrical contacts and filaments in the great and diversified electrical and radio industries of the nation. In addition to these special plants the large electrical manufacturing concerns have departments which process these metallic products and serve as auxiliary sources of supply. This industry is relatively young and, since the pure metals used in the fabrication of rod and wire are not apparently toxic, it has aroused but little interest from the standpoint of industrial health. However, the processing of tungsten and molybdenum involves the use of metallic mercury and introduces the hazard of exposure to the toxic vapors of that metal.

In order to appreciate the mechanism for development of mercurialism among workmen employed in this industry it is necessary to have some knowledge of metal treating methods used. The ultimate product —contact, filament, wire or rod—may be fabricated from pure tungsten, from pure molybdenum or from various mixtures of the two metals. Usually the tungsten is manufactured in the plant by derivation from sodium, potassium or calcium tungstate. The molybdenum is made from ammonium molybdate and molybdenum trioxide. This phase of the industry also involves exposure to toxic dusts and vapors, but the incidence of illness is low and that problem will not be elaborated on here. After the pure powdered metals are obtained and sieved the first process is one of mechanical compression into rods of various sizes from 16 to 24 inches long and ⅜ to 1 inch in square cross section. Further processing depends on whether the product is intended for electrical contacts, filaments, radio tube heaters, electrodes, x-ray targets or other types of equipment. For all of these products, however, the rods must be heat treated in order that the metal may be worked hot and drawn. Since true amalgamation is not possible, close molecular aggregation is achieved by intense heat, which is produced by passage through the rods of a low voltage high amperage current in an atmosphere of hydrogen.

Heat treatment is carried out in a separate department which houses a series of treating bottles. The apparatus[1] consists of a stand with a flat top over which a metal bell (or bottle) resembling a spirometer

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This article has been released for publication by the Division of Publications of the Bureau of Medicine and Surgery of the U. S. Navy. The opinions and views set forth in this article are those of the writer and are not to be considered as reflecting the policies of the Navy Department.

1. Smithell, Colin J.: Tungsten: A Treatise on Its Metallurgy, Properties and Applications, ed. 2, New York, D. Van Nostrand Company, Inc., 1936.

bell is supported and counterbalanced by weights. In the top of the stand there is a central depression which, when filled with metallic mercury, serves as an electrical contact, and, on the outer margin, a ring depression or groove into which the open end of the bell may be lowered. The groove is also filled with mercury to form a gas tight seal. Within the bell and supported on the stand there is an upright bracket with a clamp into which the upper pole of the rod is fastened. A spring clamp is attached to the lower pole and it in turn rests freely in the central cup of mercury. The mercury thus forms a contact for passage of electric current while providing a liquid medium for mobility of the lower electrode during shrinkage of the rod. After the rod is placed and contact is made the bell or "bottle" is lowered until its rim fits into the mercury filled groove. Hydrogen gas is then admitted to the sealed chamber displacing the air, current is allowed to flow through the rod and heat treatment proceeds for a length of time determined by the composition of the rod and its intended use. The high temperature causes cohesion of the metal particles, which, after cooling, leave a brittle rod which becomes malleable when heated and can thus be worked into wire.

The treating process just described introduces the hazard of mercurialism. Forging and swaging required for manufacture of the final product do not involve industrial health problems and will not be described in detail. The rods, which are rectangular in cross section, are forged into round cylinders of varying diameters by means of swaging. Rods of large cross section are heated in a hydrogen atmosphere and pushed through an automatic hammering apparatus called a swaging machine. Rods of smaller cross section are worked in a swaging machine, which is a combined gas furnace and automatic forge. While heated by an encircling gas flame the rod is hammered by radially arranged hammers until it is forged into smaller cylindric shapes. The rods are then drawn to wire or cut in various lengths.

The amount of mercury used and the extent of health hazard in this industry depend on many variable factors, such as the number of treating bottles, devices for the prevention of spillage and collection of waste mercury, the experience and caution of the workmen, ventilation, composition of the floors and temperature of the workroom. However, it is well known that exposure to seemingly small or laboratory quantities of mercury may cause toxicity to workmen.[2] Chronic poisoning may not occur except after many years. The experience of the hatting industry illustrates how insidiously prolonged absorption of minute amounts of mercury may undermine health and cause invalidism or death.

Mercurialism was one of the earliest recognized industrial diseases. According to Neal[3] mercury was known in India in 500 B. C., and mercury stomatitis from its medicinal use was described during the first century A. D. References to mercurialism were made by Paracelsus (1567) in "Of Miners' Consumption and Other Miners' Diseases."[4] In 1713 Ramazzini[5] quoted the opinions of numerous authorities and lent his descriptive powers to vivid accounts of the symptoms of mercurialism, writing in the chapter on diseases of miners "But it is from mercury mines that there issues the most cruel bane of all that deal death and destruction to Miners. Fallopio in his treatise 'Metals and other minerals' says that mercury miners can hold out for barely three years; Ettmüller in the chapter on mercury in his Mineralogia says that within four months they become subject to the palsy of the limbs (tremors), paralytic, and suffer from vertigo and this is caused by the mercurial spirits, which are particularly injurious to the nerves." Concerning gilders, Ramazzini says "We all know what terrible maladies are contracted from mercury by goldsmiths, especially by those employed in gilding silver and copper objects. This work cannot be done without the use of amalgam, and when they later drive off the mercury by fire they cannot avoid receiving the poisonous fumes into their mouths even though they turn away their faces. . . . Very few of them reach old age, and even when they do not die young their health is so terribly undermined they pray for death. Palsy of the neck and hands, loss of teeth, uncertain gait, and scelotyrbe, all these are assigned to them by Jüngken in his 'Experimental Chemistry.'" Olaus Borch is quoted from the "Medical Transactions of Copenhagen" regarding the case of a gilder stricken with mercurialism. "The distinguished author," say Ramazzini, "thinks that the palsy was caused by the impact on the nerves of the smallest possible atoms of steaming mercury (corpuscula fumantis Mercuri minutissima) and that directly these were taken into the blood mass they hindered its proper flow."

The uses of mercury have increased progressively during the era of industrialization and the hazard of mercurialism is no longer limited to the miner and the gilder. In their compilation of occupational hazards in 1933 Dublin and Vane[6] listed eighty industries which use mercury in potentially harmful amounts. Among these industries are cinnabar mining and smelting, the fur felt and hatting trades (where the fortunate discovery of new carroting agents is eliminating the use of mercury nitrate in the treating of fur), the manufacture of Edison cell storage batteries, calibration of apparatus in the glass industry, manufacture of mercury fulminate in the explosives industry, reclaiming of precious metals from dental waste, installation of mercury boilers and vapor turbines, as well as many laboratory procedures in almost every conceivable field of science. So far as I know, however, there has been no prior report of mercury poisoning resulting from the manufacture of tungsten and molybdenum rod and wire.

In one of the large plants in which most of the following observations were made, the metal treating department was originally housed in an open shedlike structure and consisted of only three or four treating bottles. During several years of small scale operation no instances of mercurialism were observed and the hazard was not suspected. In 1938 the treating department was expanded and the apparatus was set up in a corner of the plant. The floor was wooden, no precaution was taken to collect spilled mercury, ventilation was poor and no attempt was made to provide fume hoods or forced draft. On Nov. 14, 1939 the first recognized case of mercurialism was referred for exami-

2. Turner, J. A.: A Report of Poisoning from Small Quantities of Mercurial Vapor, Pub. Health Rep. **39**: 329-341 (Feb. 22) 1924. Shepherd, Schukman, Flinn, Hough and Neal.[6]

3. Neal, P. A.: Mercury Poisoning from the Public Health Viewpoint, Am. J. Pub. Health **28**: 907-915 (Aug.) 1938.

4. Koelsch, Franz.: Theophrastus von Hohenheim genant Paracelsus: "Von der Bergsucht und andere Bergkrankheiten," Schrift. a. d. ges. d. Gewerbehyg., 1925, No. 12.

5. Ramazzini, Bernadini: Diseases of Workers, The Latin Text of De Morbus Artificum. Latin text of 1713, revised, with translation and notes by Wilmer Cave Wright, Chicago, University of Chicago Press, 1940: Miners, p. 21; Gilders, pp. 33-35.

6. Dublin, L. I., and Vane, R. J.: Occupation Hazards and Diagnostic Signs, Bulletin 582, U. S. Dept. of Labor, Bureau of Labor Statistics, 1933, p. 40.

nation. Because of the symptomatology presented an inspection of the plant was undertaken and engineering consultation was requested. It was discovered that mercury was allowed to remain in puddles on the floor under the treating apparatus, that the metal had seeped through the floor and was dripping from the beams into a lavatory on a lower level and that in the use of the equipment no attempt was made to reduce the splashing of mercury droplets from the electrode cup or bottle seal. On occasions the waste mercury was swept up and discarded, but that which was in relatively inaccessible places was allowed to remain.

During the period from 1939 to 1944 a considerable number of cases of acute and chronic mercurialism were found among employees in the plant just described and in another somewhat smaller establishment. Only 2 clearcut cases were encountered from the smaller plant, both of which presented the typical findings of advanced chronic mercury poisoning (compare case 2) in workmen who had been continuously employed for seven years. The smaller plant exercised fair control and housed the treating bottles over a concrete floor in a large open room well ventilated by adjacent windows except during inclement weather. Even here, however, spillage was considerable and there was no provision for exhausting the treating equipment.

In order to diminish the obvious hazard in the plant where the first case of mercurialism was encountered, an engineering program was proposed. This was to have involved replacement of the wooden floor with metal plate, construction of a tilted single table top for all the treating bottles, which would prevent spillage and permit collection of waste mercury, housing of the apparatus within a closed hood, which would be forcibly exhausted and ventilated separately from the areaway from which the workmen were to control and load the treating equipment, and so on. This plan was modified to an extent which ultimately proved almost disastrous: the mercury saturated flooring was covered with a composition material, a few minor changes were made to collect spilled mercury, and the treating room which was closed off by partitions was air conditioned as a unit. Following the engineering foray the incidence of mercurialism rose sharply, for obvious reasons. The forced circulation of air throughout the department increased the vaporization of mercury, subjecting the workmen to an even greater exposure than existed before air conditioning the room. Concurrently the demand for increased production resulted in continuous operation for at least two and frequently three eight hour shifts daily.

Ultimately, many of the originally recommended protective measures were carried out, but despite installation of hoods and separate ventilation of the working area sporadic cases of mercurialism continued to occur. Morbidity was diminished by establishment of a medical program of preemployment examinations and periodic inspection, but the hazard of chronic mercurialism was effectually diminished only by the rapid labor turnover and the brief tenure of most of the employees. Improvements in the sanitary engineering of the plant were carried out during a period of rapid expansion and high productivity. As a consequence cases of mercurial stomatitis were found to occur within four weeks after employment, and 1 employee developed the condition after working in the department only a few days. In this instance a sheet metal worker installing new exhaust apparatus had to cut through flooring impregnated with mercury and frequently swept up puddles of mercury with the sawdust and débris on the floor. On one occasion some mercury laden dust was accidentally swept directly into his face as he worked under the treating room floor. He presented a full blown gingivitis and associated systemic toxicity within a week after initial exposure.

The frequency of mercury poisoning in this industry is determined by a great many factors aside from the precautionary measures undertaken by the plants and the resulting degree of vapor concentration in the workroom atmosphere. When the production level is low, the incidence of mercurialism tends to fall. Similarly, when labor turnover is rapid there is little opportunity for development of subacute or chronic intoxication. However, the combination of failure of sanitary measures and high productivity has resulted in minor epidemics of acute intoxication, some of which have resulted in serious morbidity. One patient developed a spreading infection from suppurative gingivitis, which involved a preauricular lymph node and lighted up an old mastoiditis the spread of which extended to the auriculotemporal joint, the facial canal and parotid region. Cure was accomplished only after radical mastoidectomy, partial dental extraction, secondary incision and drainage and intensive local and parenteral administration of penicillin.

Case histories of chronic and subacute mercurialism are presented in order to illustrate the characteristic but variable symptomatology. The diagnosis is established when the clinical findings are correlated with a history of exposure, and it may be supported by the finding of mercury in the urine (in the absence of recent mercurial medication) or the demonstration of a toxic level of mercury in the occupational environment. Aside from the typical cases, problems involving difficult differential diagnoses were frequently encountered. One patient with gastrointestinal complaints, anorexia and vomiting was found to have trichinosis; another who complained of progressive weakness and loss of weight had pulmonary tuberculosis. One patient with questionable mercurial stomatitis had a demonstrable peptic ulcer. The importance of critical evaluation of symptoms and careful study of each case is emphasized because of the danger of assuming that every sick workman in an industry of known hazard is suffering from the effects of toxic exposure. In this particular field the finding of mercury in the excreta must not be permitted to mislead the diagnostician, since mercury is present in the urine of most of the subjects tested regardless of symptoms or the presence of intercurrent disease.

CASE 1.—*Chronic mercurialism.* A. B., a white man aged 25, on Oct. 28, 1941 reported for examination because of tremor of the hands, pain and numbness of the upper extremities and painful gums. He had been employed in the treating department for five months. He was not previously exposed to mercury and his industrial history was negative aside from employment as an anthracite miner for three years. The past history was noncontributory and the family history was negative. About a week prior to examination he noted soreness of his gums and for four days complained of slight headache. His appetite was poor. He had lost about 23 pounds (10 Kg.) during five months. Aside from loss of weight and anorexia there were no acute symptoms until Oct. 23, 1941, when the patient suddenly developed tremor of the hands while at work. It was necessary for another employee to help him place the

electrodes in the treating bottles because his hands shook so much that he was unable to carry on.

The patient on physical examination appeared asthenic. He weighed 129½ pounds (58.7 Kg.) and was 68⅞ inches (175 cm.) tall. His best prior weight was 150 pounds (68 Kg.). The blood pressure was 116 systolic and 82 diastolic. The temperature and pulse were normal. He appeared somewhat undernourished and generally under par. There were many missing and several carious teeth. Dental occlusion was poor. The gums were hypertrophied and locally receded. A bluish line was present in the gum tissue about the upper and lower central teeth and in the upper left molar region. Pressure on the gum tissue caused bleeding and exudation from the gingival crevice. There were no significant findings referable to the neck, lungs, heart or abdomen. The genitalia and extremities were normal. Fluoroscopy revealed increased linear markings extending toward the apex from the right hilus.

There were no gross psychiatric abnormalities. Romberg's sign was negative. The gait was synergic and free, and there was no dysmetria or nystagmus. The sensory system was intact for all modalities. There was no disturbance of motor power, but coarse tremors were noted involving the outstretched fingers and the muscles of the upper extremities. There was a definite intention quality to the tremor, as indicated by the finger-to-nose and related tests. The handwriting showed a somewhat rhythmic irregularity of the script, particularly pronounced when attempting to write slowly. In the drawing of straight and curved lines irregular and progressive tremulousness was noted.

The cranial nerves were normal. The superficial reflexes exhausted readily. The deep reflexes were generally hyperactive, particularly those of the lower extremities. There were no pathologic reflexes.

The blood count was normal. There were 4.84 million erythrocytes. The hemoglobin (Sahli) was 13.8 Gm. and the leukocytes numbered 5,300. The differential count was normal and no stippling or other abnormality of the erythrocytes was observed. The sedimentation rate (Westergren) was 2 mm. per hour. The Kahn and Hinton tests were negative. The urinalysis revealed a specific gravity of 1.017, no albumin or sugar. The microscopic examination was negative. Examination of the urine for mercury by the dithizone method revealed a trace of the metal.

Dental consultation confirmed the diagnosis of mercurial gingivitis, although roentgenograms of the teeth failed to reveal much alveolar destruction. Under observation and treatment, which terminated on Nov. 19, 1941, there was progressive diminution of tremor, improvement of gingival tone and gain of weight.

CASE 2.—*Chronic mercurialism.* A. H., a white man aged 59, on Jan. 27, 1943 was hospitalized because of weakness, tremor and painful gums. He was employed in the treating department for approximately eight years and worked continuously until Jan. 23, 1943. The plant where he was employed was ventilated only by means of windows situated behind the row of treating bottles, and during the winter the windows were opened only in mild weather. Early in 1942 the patient first noted soreness and dryness of the throat, and somewhat later he began to complain of periodic gastric distress. Ten months prior to examination he first became aware of tremor. His family physician was unable to find any physical abnormalities. Soreness of the mouth became progressively worse, but the diagnosis remained obscure. The past medical and family history were noncontributory. There was no history of alcoholism. The systemic review was negative.

On Feb. 10, 1943 physical examination revealed that the patient was well muscled, weighed 145 pounds (66 Kg.) and was 66 inches (168 cm.) tall. The blood pressure was 114 systolic and 76 diastolic. The temperature and pulse were normal. Both eyes showed immature cataracts. Hearing was slightly impaired. There were a few missing teeth. Dental occlusion was poor. There was moderate recession of the lower anterior gums and a faint gray line along the margin of the receded tissue. The gums did not bleed easily on traumatization. The tonsils were of moderate size, not inflamed. The lung fields were clear. The cardiac examination was negative. The liver margin was palpable 1 fingerbreadth below the costal margin. The abdomen was otherwise normal. The genitalia and extremities were normal. The peripheral arteries were not unduly thickened.

The patient was of good intelligence and there were no psychiatric abnormalities except tension and anxiety. There was no disturbance of gait or station. There was a very noticeable intention tremor in the finger-to-nose test, and there were coarse tremors of the outstretched hands of intention type and of variable amplitude. During the course of observation and on attempted performance of purposive acts the tremor became much more pronounced and spread to involve almost all the muscles of the neck and trunk. There was no motor weakness. The cranial nerves were normal. The deep reflexes of the upper extremities were hypoactive, while those of the lower extremities were somewhat hyperactive. There was abortive clonus at the achilles and patellar tendons. There was an equivocal Babinski reflex on the left and a positive Babinski reflex on the right.

The laboratory findings were essentially negative. There was no anemia. The leukocytes numbered 13,400 per cubic millimeter and there was a slight shift to the left. The sedimentation rate was 7 mm. per hour. The Kahn and Hinton reactions were negative. The blood sugar was 106 mg. per hundred cubic centimeters. Urinalysis revealed a specific gravity of 1.014, no albumin or sugar, and an occasional hyaline and coarse granular cast. Examination of the urine for mercury by the dithizone method gave a negative reaction. (At the time of examination the patient was hospitalized and had not been exposed to mercury for several weeks.)

The patient was reexamined on March 18, 1943, at which time he presented a similar but somewhat less pronounced tremor. There was no change in the physical findings. The handwriting at that time showed pronounced tremor, and the signature was illegible. In the drawing of straight and curved lines there was progressive and decided irregularity.

Another workman examined at the same time whose industrial exposure was identical also presented the characteristic neurologic findings of advanced mercurialism.

CASE 3.—*Acute mercurial stomatitis.* L. P., a man aged 42, a Filipino, was referred for examination on Sept. 2, 1943 because of painful bleeding gums and excessive salivation. A musician until 1943, the patient was employed in the treating department for approximately six months. The family and past histories were negative except for gonorrhea in 1923. About two and one-half weeks prior to examination he first noted excessive salivation and a bad taste in the mouth. Subsequently his gums became painful and swollen and bled freely when the teeth were brushed. He informed the examiner that twenty-six metal treating bottles were in operation in the plant where he was employed and that twenty-four of them were in use continuously twenty-four hours daily.

Physical examination revealed that the patient was asthenic but well muscled. He weighed 112½ pounds (51 Kg.) and was 61⅜ inches (157.5 cm.) tall. The blood pressure was 114 systolic and 66 diastolic. The temperature and pulse were normal. There was fetor oris. The teeth were in poor repair: many were missing and there were advanced caries, sordes and drifting of the remaining teeth. The gums were spongy and inflamed. There was a very faint dark discoloration along the gingival margin. In the submaxillary region there were tender enlarged lymph nodes. The neck was otherwise normal. The lungs were clear. The heart was negative to physical examination and fluoroscopy. The abdomen, genitalia and extremities were normal.

Neurologic examination was entirely negative. There was no disturbance of gait, station, coordination or sensory function. There were no tremors of the outstretched hands. Motor power

was normal. The cranial nerves were normal and the reflexes were physiologic.

A complete blood count was negative. There was no leukocytosis. The sedimentation rate was 26 mm. per hour (Westergren). The Kahn, Hinton and Mazzini tests were negative. The blood sugar (nonfasting) was 142 mg. per hundred cubic centimeters and the urea nitrogen was 11 mg. per hundred cubic centimeters. A smear from the gingival exudate revealed a large number of fusospirochetes and blood cells by dark field microscopy. The urine showed no mercury by the dithizone test. Routine urinalysis was negative. Roentgenograms of the mouth showed alveolar resorption.

The diagnosis was mercury poisoning, subacute, with mercurial gingivitis.

DIAGNOSIS

Mercury may enter the body as inhaled vapor, by ingestion of metallic particles or through the skin. Poisoning by the metal must not be confused with acute administration of mercurial salts, the effect of which is similar only in respect to the stomatitis which may develop during convalescence. Soluble mercurial salts are violent corrosive agents and are extremely nephrotoxic. Metallic mercury has neither of these properties, and renal disease is not characteristic of either acute or chronic mercurialism of industrial origin. Occupational mercurialism may develop acutely or subacutely following exposure to metallic mercury in a liquid or vapor state. More gradual exposure may result in chronic mercurialism without the development of signs of subacute intoxication. The clinical syndromes of acute and chronic mercurialism are fundamentally different, since the manifestations of the former are due to involvement of the gastrointestinal tract, while those of the latter are almost entirely of central nervous system origin.

Acute mercurialism may be suspected when there is a history of exposure to metallic mercury even in minute quantities and the patient presents an acute spongy gingivitis, an ulcerative stomatitis or, occasionally, colitis. The presence of a dark line on the gums is characteristic but not uniformly present. In differentiating the various types of stomatitis it is, of course, important to rule out recent administration of bismuth or of mercury and to exclude agranulocytosis and other diseases by routine laboratory tests. Lead poisoning is not usually a problem, since the blue gray line of plumbism is fairly distinctive and is not commonly associated with gingivitis. The presence of fusospirochetes must not confuse the issue, since these organisms commonly invade damaged gingival tissue and are present uniformly and in large numbers in mercurial stomatitis or gingivitis.

Aside from stomatitis the patient may complain of anorexia, weakness and digestive disorder. Ordinarily there are no tremors or other neurologic manifestations. Laboratory aids are of little help. The blood count is usually normal, although leukocytosis may result from the oral infection. If the urine is examined during or shortly after the period of exposure, metallic mercury will usually be found. It is essential that the test be done by an experienced toxicologist, and the method preferred is the test with dithizone.[7] The presence of mercury in the urine is proof of exposure to mercury. It does not indicate whether mercury has been inhaled as a vapor or ingested as metal or salt and is not diagnostic of mercury poisoning.

7. Gettler, A. O., and Lehman, R. A.: Simplified Procedure for Determination of Mercury, Am. J. Clin. Path., Tech. Supp. **2**: 161 (Sept.) 1938.

Subacute mercurialism is usually suspected when workmen with known exposure present symptoms of general ill health. Usually the diagnosis is made by exclusion, and frequently in suspected cases nonindustrial disease is discovered. It is in this type of case that critical and thorough study is particularly necessary. The diagnosis is made when findings of chronic gingivitis, alveolar resorption and salivation are associated with anorexia, weight loss, asthenia and occasionally pallor, slight anemia and nervous irritability.

The most characteristic clinical syndrome is that resulting from prolonged exposure to very low concentrations of mercury. Chronic mercurialism is a disease of the nervous system and its manifestations are much the same whether the poisoning occurs among miners, hatters or metal treaters. The time required for development of the full blown syndrome varies with the exposure. The miner or smelter of cinnabar may come down with violent "shakes" within a year and at the same time may present a necrotic gingivitis. Usually it requires fifteen to thirty years' employment as a hatter to produce a similar syndrome, and signs of local mucosal disease may be entirely wanting. Tremor, known to all trades as the "shakes," is the most characteristic symptom. This tremor may be of variable intensity and there may be a constantly present fine component, but its most distinctive quality is that of intensification by attention or intention. It resembles the tremor of parkinsonism at times but differs in that the latter diminishes with intention while the mercurial tremor may evolve into sweepy jerky movements. It is much more pronounced than the intention tremor of disseminated sclerosis and is reinforced not only by intentional movements but also by the attention of the examiner, by emotional tension and by nonpurposive acts. Early in the disease habitual actions may be performed by the involved extremity, but later even these are impaired by tremor. The tremor of chronic mercurialism can best be demonstrated even early in the disease by testing the ability of the workman to draw straight and curved lines and by observing the handwriting. It is important not only to study the results of these tests but to watch the actual performance. In some cases it is important to rule out malingering, especially since most cases involve the question of compensation. The tremor usually manifests itself as a progressive irregularity of line, sometimes violent at the end. The handwriting tends to become less legible, and frequently the subject will give up the attempt to write more than two or three words. Micrographia has been observed but is not characteristic.

In addition to tremor there are frequently complaints of muscle pain or tension. Right handed workmen usually suffer pain about the right shoulder, and the musculature of the region may be somewhat indurated and tender. Muscle cramps may occur, especially at night. Irritability, unexplained depression, even confusion may occur, but these signs of so-called mercurial erythism are not usually present except in advanced cases. Since most patients with advanced chronic mercurialism are middle aged or older, it is the rule to find associated systemic disease or manifestations of arteriosclerosis. Frequently it is impossible to determine whether the wide variety of symptoms is due to the intoxication or to coexisting somatic deterioration. There is no reliable basis for concluding that

mercurialism may aggravate arteriosclerosis, and frequently insuperable problems result when typical senile paralysis agitans develops in workmen long exposed to mercurialism. Since the problem is frequently medicolegal as well as medical, such issues are usually and properly resolved in favor of the disabled workman.

HYGIENE

In order to prevent toxic mercurial exposure in industry, the first requirement is a healthy respect for the dangerous properties of quicksilver. Since it is a liquid, mercury can seep into crevices, penetrate wooden floors, collect in interstices, mix with dust or amalgamate with solid metals. Wherever it collects, mercury vaporizes at room temperature and in the course of time potentially hazardous concentrations in the atmosphere may result from seemingly negligible spillage. Therefore, careful engineering and good housekeeping are the first essentials of plant hygiene. Whenever possible the metal should be used in closed procedures, and safety devices should be available in case of breakage or spillage. When used openly as in the heat treating of metals, the equipment should be so designed as to limit splash to a minimum, to insure collection of all droplets by an efficient gravity method and to avoid spaces and corners where puddles may accumulate. Ventilation is a difficult problem, and the error of forcibly ventilating open rooms containing mercury must be avoided. Exhausts should be placed so as to draw off the air from the apparatus where mercury is used, and the work space should be supplied with fresh air from an outside source. Wooden construction should be avoided, and flooring of concrete or composition materials should be maintained without cracks or open interstices. All apparatus should be simple in external construction and as far as possible free of needless angles or compartments. Isolating exposed mercury within exhaust hoods is to be recommended, provided the effectiveness of the exhaust system is frequently checked and the apparent safeguard is not allowed to contribute to carelessness. It is a common experience to find pools of mercury within hoods or on the floors after removal of guard plates.

According to Shepherd and his associates [8] the toxic limit of mercury is 0.1 mg. per cubic meter of air. This is equivalent to approximately 1 part to 50,000,000 by volume. Apparatus is now available at low cost which is said to have a sensitivity of 0.082 mg. of mercury per cubic meter of air.[9] Since there are not yet sufficient data to assure the safety of even 0.1 mg. per cubic meter over long periods of time, even more sensitive equipment may be desirable in order to check the effectiveness of engineering control. The General Electric instantaneous vapor detector [10] is said to be sensitive to less than 1 part of mercury per billion by volume. In the use of the more sensitive instrument, however, caution must be exercised to exclude ozone and illuminating gas from the atmosphere tested, since similar effects to that of mercury are produced in the ultraviolet spectrum.

Aside from plant hygiene, close medical supervision of workmen and selective employment should form part of the control program. Preemployment examination should screen out all candidates with chronic disease and dental abnormalities which might facilitate development of stomatitis. Radiography of the lungs should be routine. Dental examination should include radiography in doubtful cases, and all applicants with chronic gingivitis, deep gingival pockets, pronounced malocclusion and extensive uncorrected caries should be rejected. A general recheck should be made every month, and any workers showing evidence of swelling of the gums or complaining of sore mouth or salivation should be referred for dental examination. Neurologic examination should include tests for tremor, including a handwriting test. It is well to have a card with a faintly demarcated circle about 2 inches in diameter and crossed or angular lines about 3 inches long. The subject tested should be asked to trace the lines with uninterrupted strokes of the pencil and to write a standard test sentence dictated by the examiner. As far as chronic mercurialism is concerned, the handwriting test is the most valuable single means of early detection.

Personnel should be instructed in precautions necessary to prevent absorption of mercury. Facilities for washing and for showers after the work shift should be provided. Separate lockers should be provided for work clothes and for street clothes, and work clothes should be changed twice weekly. Clean lunch rooms should be provided, and food should not be permitted in the workrooms. Oral hygiene should be promoted and adequate dental care assured by periodic examination by the plant dentist.

TREATMENT

Acute industrial mercurialism is almost wholly a dental problem. In exceptional cases the systemic symptoms are sufficiently severe to warrant active medical care or even hospitalization. In such cases the judicious use of saline laxatives, high caloric soft diet and administration of sodium thiosulfate intravenously are usually the only measures required. Dental treatment should be directed to eradication of the associated fusospirochetal infection by means of any of the accepted agents. At times alveolar resorption may cause the loss of teeth. Complications arising from extension of infection may require chemotherapeutic or even extensive surgical measures.

Early chronic mercurialism frequently responds favorably to removal from exposure and ordinary medical supervision: sedation, nutritious diet, vitamin supplements, physical therapy. Sodium thiosulfate intravenously is a traditional remedy in mercurial and arsenical poisoning, but its effectiveness is difficult to evaluate and I have not been convinced of its usefulness.

Advanced involvement of the nervous system resulting in well established tremor, muscular tension and early psychologic change is extremely resistant to treatment in most cases. In some instances the symptoms subside spontaneously, but most of the time the tremor becomes fixed or progressive and a high degree of invalidism results. In the course of time many of these patients suffer total disability. In the group of cases referred to serious disability remained in the 2 advanced cases of nervous system disorder despite a long period of hospitalization and medical care.

SUMMARY

A specialized manufacturing industry is responsible for the supply of much of the tungsten, molybdenum and tungsten-molybdenum wire and rod used in the elec-

8. Shepherd, M.; Schukman, S.; Flinn, R. H.; Hough, A. W., and Neal, P. A.: Hazards of Mercury Vapors in Scientific Laboratories, J. Research Nat. Bur. Stand. **26**: 357-375, 1941.
9. Mercury Vapor Detector (Selenium Sulfide), Bulletin DO-1, Mine Safety Appliances Company, Pittsburgh.
10. Woodson, T. T.: A New Mercury Vapor Detector, Rev. Scient. Instruments **10**: 308-311 (Oct.) 1939.

trical and radio industries. The process of heat treating these metal products involves the use of metallic mercury and introduces the occupational hazard of mercurialism.

Acute and chronic industrial mercurialism are not to be confused with acute poisoning by ingestion of mercurial salts. Acute industrial intoxication is largely a disease of the oral mucous membrane. Chronic mercurialism is a disease of the nervous system with characteristic manifestations and frequently unfavorable prognosis.

Sanitary engineering to prevent toxicity from mercury involves careful and controlled housekeeping, design of equipment to prevent accumulation of mercury and to promote collection of spillage, ventilation to insure a minimum concentration of mercury in the air and housing of apparatus within hoods which are forcibly exhausted. Supervised personal hygiene of workmen, preemployment examination and frequent medical observation are also essential for the prevention of morbidity.

In the treatment of mercurialism, removal from exposure is the first essential. Dental care is important in all cases showing gingivitis and stomatitis and is usually all that is required in early acute cases. The treatment of chronic mercurialism is largely empirical and consists of symptomatic and supportive measures.

Clinical Notes, Suggestions and New Instruments

SEDATION AS AN UNEXPECTED SYSTEMIC EFFECT OF PRIVINE

J. I. WARING, M.D., CHARLESTON, S. C.

Three cases are reported in which privine hydrochloride produced sedation. This effect might not have been anticipated from the general character of the drug, which gives a complicated type of systemic stimulation in animals. Trial observations by Drs. F. M. Martin and R. P. Walton in the Department of Pharmacology disclosed that intravenous doses in 4 rats and 3 dogs produced hyperpnea, gross muscle spasms, occasional reflex hyperexcitability and convulsions. The effects of fatal doses suggestively resembled acute epinephrine deaths.

The clinical observations have a parallel in the systemic actions of ephedrine, which is ordinarily a stimulant or analeptic drug in adults. In a report by Bonzanigo[1] ephedrine was found to produce sedative effects frequently in children between the ages of 3 months and 14 years. Ephedrine was given to these patients in doses large enough to produce the characteristic hypertension.

CASE 1.—A girl aged 7 years, with vasomotor rhinitis, had been given a prescription (by another physician) which directed that 5 drops of privine hydrochloride (0.1 per cent solution) be taken in each nostril three times a day. Consistently after each administration the patient felt drowsy and talked vaguely for several hours. After the drops were omitted she seemed normal.

CASE 2.—An infant girl aged 3 months with acute rhinitis was given a prescription for privine hydrochloride (0.05 per cent solution) to be used as 2 drops in each nostril every four hours. After each treatment she slept for about eight hours, so that ordinarily the drug was given only at eight hour intervals. On one occasion she was definitely drowsy for twenty-four hours after receiving only 2 drops of the solution. No similar effect was noted when another preparation (neosynephrin hydrochloride 0.25 per cent) was used.

CASE 3.—A boy aged 3 years drank an uncertain amount of privine hydrochloride 0.05 per cent solution, probably 7 or 8 cc. He soon became quite drowsy and remained so for several hours afterward.

82 Rutledge Avenue.

From the Department of Pediatrics, Medical College of the State of South Carolina.

1. Bonzanigo, Curzio: Klinisch-experimentelle Untersuchungen der Ephetonin-Wirkung im Kindersalter, Arch. f. Kinderh. **94**: 15, 1931.

CURARE IN THE ACUTE STAGE OF POLIOMYELITIS

PRELIMINARY REPORT

NICHOLAS S. RANSOHOFF, M.D., LONG BRANCH, N. J.

A preparation of curare[1] has been used in the Orthopedic Service of the Monmouth Memorial Hospital in the past 4 consecutive cases of acute anterior poliomyelitis. In view of the present prevalence of this disease and the striking improvement of the symptoms obtained, the publication of the present preliminary report seems warranted.

REPORT OF CASES

CASE 1.—D. G., a girl aged 2½ years, was admitted with acute anterior poliomyelitis. Nuchal rigidity was pronounced, and there were rigidity of the entire back, hamstring spasm on both sides and gastrocnemius spasm on the right. The patient was treated in the routine way for ten days and was then given 0.9 mg. of curare per kilogram. Within two hours after the initial administration of the drug the child was sitting up in bed and playing for the first time. There was definite diminution of the nuchal rigidity and in the rigidity of the back. Both legs could be flexed at the hip with the knee extended to 90 degrees.

CASE 2.—M. G., a girl aged 13 years, was admitted to the hospital five days previously with the diagnosis of acute anterior poliomyelitis. She had been in almost continuous pain, which was not relieved by mild sedation or hot packs. There was complete paralysis of the left lower extremity, definite abdominal weakness and weakness of the right quadriceps. An intramuscular injection of 0.9 mg. of curare per kilogram was given. Within twenty minutes the patient was fast asleep for the first time since admission. She slept for ten hours, at which time she awoke complaining of pain in the back again. Hot packs were applied and after the first fifteen minute pack she dropped off to sleep again. The following day there was still a great deal of spasm of her back muscles and a great deal of rigidity of her back, although her nuchal rigidity had diminished considerably. Another dose of curare was administered, 0.9 mg. per kilogram. She has been pain free ever since. There was definite improvement in the strength of her abdominal muscles. Her back is still rigid, but much less so.

CASE 3.—J. D., a boy aged 10 years, was admitted with acute anterior poliomyelitis, ptosis of the left eyelid, paralysis of the right facial muscles, and difficulty in swallowing and breathing. There was pronounced nuchal rigidity and back spasm. The respirator was kept next to his bed with the idea that he might need it. After 0.9 mg. of curare per kilogram his breathing came easier and he swallowed without difficulty. The following day his ptosis had disappeared and there was much more strength in his facial muscles. On the second day he was found sitting up in bed.

CASE 4.—M. G., a girl aged 3, was admitted with acute anterior poliomyelitis. Nuchal rigidity and opisthotonos were pronounced. The child was crying continually and was most irritable. As by the time this child was admitted it had been decided to give curare to the patients with acute poliomyelitis, she was given immediately 0.9 mg. per kilogram. Within one-half hour her opisthotonos, which had kept her back off the bed, had disappeared and she was sleeping. The Kernig sign, which had been positive, disappeared.

From the Orthopedic Service of the Monmouth Memorial Hospital.

1. Intocostrin (Squibb).

COMMENT

This preliminary report is being presented because there is a great deal of poliomyelitis in the country at the present time, and it is hoped that other observers will use this drug. Whether or not 0.9 mg. per kilogram is the ideal dosage is not known, but it is felt that in the more severe cases and in older children it will probably be necessary to increase this dose.

ACUTE SECONAL POISONING

REPORT OF A FATAL CASE WITH AUTOPSY

LIEUTENANT COMMANDER MARK C. WHEELOCK (MC), U.S.N.R.
AND
CAPTAIN ALFRED M. FREEDMAN
MEDICAL CORPS, ARMY OF THE UNITED STATES

The wide and promiscuous use of barbiturates provides ample opportunity for their employment in suicides. Case reports of death due to most of the barbiturates have been made in the literature, and information is available concerning their toxicity.[1] A survey of the literature has failed to reveal any cases of seconal poisoning which terminated fatally. It was therefore felt important to report a case of seconal poisoning which eventuated in death.

REPORT OF CASE

A white man aged 24, a corporal, was discovered dead the morning of April 20, 1944, in his barracks. It was known that he had been a retiring and seclusive individual, who seemed to have made a poor adjustment to military activity. Recently he had been rejected for overseas duty because of "neurasthenia." He was not known to have had any other illnesses, and a survey of this and previous posts showed that he did not report on sick call or receive medical treatment at any time. On April 19 the victim behaved in his customary manner. He did not complain of any illness or appear unusually moody. He retired at the usual hour (10 p. m.), and during the night men sleeping in adjacent beds detected no disturbances or outcry.

The following morning, when his sergeant attempted to awaken him, he was found to be dead. Careful search of his effects, barracks and the surrounding area failed to reveal any drugs or poisons. No history of having obtained any drugs from army physicians, civilian physicians or local drug stores could be procured. A check of the careful record that is kept of all sedatives and narcotics, according to army regulations, failed to reveal any instances of drugs having been stolen.

Autopsy was performed on April 20, soon after death. Complete and careful autopsy, including the head, failed to reveal any anatomic cause of death. The positive anatomic findings were as follows:

Cardiovascular System: Hypertrophy of heart, 350 Gm., fatty infiltration of myocardium.

Respiratory System: Passive hyperemia of lungs, moderate; primary tuberculous focus, right upper lobe, obsolete.

Spleen and Hemopoietic Tissues: Passive hyperemia of spleen, moderate; acute hyperplasia of spleen, 440 Gm.; delayed clotting of blood.

Gastrointestinal System: Lymphocytic infiltration and dilatation of veins in the submucosa at junction of esophagus and stomach.

Liver: Parenchymatous degeneration of liver, 1,750 Gm.

Genitourinary System: Passive hyperemia of kidneys, moderate; adrenal rest, left kidney.

Bones and Joints: Hyperplasia of bone marrow.

Because of suspicion of possible drug poisoning, the stomach contents, intestinal contents, urine and blood were saved and submitted to the Army Medical School for toxicologic analysis. The study of the entire gastric content, 27 cc., revealed 0.9 Gm. of seconal. In 800 cc. of urine, 24 mg. of seconal was likewise found. No barbiturate was found in the blood. No evidence of any other drugs was found.

COMMENT

Seconal sodium is a short acting barbiturate that has been introduced for medical use in the past decade. The average adult hypnotic dose of seconal is stated to be 0.1 to 0.2 Gm.[2] In animal experiments, after oral administration of a single anesthetic dose, anesthesia appears within one-half hour and symptoms completely disappear in twelve hours. Clinically, seconal sodium exerts its effect within fifteen to twenty minutes, while its duration of action is between five and seven hours. Since seconal is a short acting drug, it is destroyed almost completely in the liver. Renal excretion occurs rather slowly and takes place only when a relatively high blood level is present. Seconal is not recovered in the urine when the dose is in the sedative range.[3]

In this case it is apparent that unconsciousness had existed for a considerable period before death occurred. The stomach was practically empty (27 cc. of stomach content) and the bladder was much distended (800 cc. of urine content in the bladder). It was estimated that death occurred at 4 to 5 a. m. or six to seven hours after the patient was observed to retire. The presence of 24 mg. of seconal in the 800 cc. of urine points to a high seconal level in the blood at one time. Likewise the discovery of 0.9 Gm. of seconal in 27 cc. of gastric contents indicates that a much larger dose must have originally been taken. It has been stated that fifteen times the ordinary hypnotic dose is fatal. The presence of a dose of seconal in the stomach almost as high as the fatal dose after six to seven hours of absorption had taken place brings one to the conclusion that the victim ingested a large amount of seconal. The failure to discover any seconal in the blood is explained on the basis of rapid destruction by the liver.

Early death in barbiturate poisoning is usually the result of paralysis of the respiratory center. The shorter acting barbiturates are particularly prone to produce death by respiratory depression.[2] The conclusion reached in this case shows that the cause of death was acute seconal poisoning.

The findings were submitted for review to the Army Medical Museum, and the interpretations were confirmed. Further, the case was also submitted to Dr. Alan R. Moritz, professor of legal medicine, Harvard University, who likewise agreed with the diagnosis of acute seconal poisoning.

This death due to an overdose of seconal is believed to be the first one reported. Noble[4] reports that a woman recovered following the ingestion of 28½ grains (1.9 Gm.) of seconal, although she was in deep coma for a considerable period of time. The patient treated by France, Barnett and Yonkman[5] was found at the point of death one hour after consuming 125 grains (8.3 Gm.) of a mixture of soluble pentobarbital and seconal. Vigorous treatment with picrotoxin and metrazol brought about full recovery. An unsuccessful suicide attempt has been described by Dorsey.[6] The victim took 20 grains (1.5 Gm.) of seconal and was found nine hours later comatose, breathing so slowly that artificial respiration was necessary. Heroic therapy with picrotoxin was successful. The amount of seconal ingested in the case reported here is, of course, unknown, but has been estimated as at least 45 grains (3 Gm.).

This case emphasizes that the same care must be used in the employment of this drug as with other barbiturates. Further, it illustrates the necessity for saving stomach and intestinal contents, urine, blood and tissue, as needed, in order to pursue toxicologic investigation in all cases of death in which the cause is not readily apparent.

This article has been released for publication by the Division of Publications of the Bureau of Medicine and Surgery of the U. S. Navy. The opinions and views set forth in this article are those of the writers and are not to be considered as reflecting the policies of the Navy Department.

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Council on Pharmacy and Chemistry

REPORT OF THE COUNCIL

The following statement has been authorized for publication by the Council on Pharmacy and Chemistry.

AUSTIN SMITH, M.D., *Secretary,*

THE ADDITION OF SALT TO DRINKING WATER

A number of preparations containing sodium chloride have been made available commercially for distribution during hot weather to office employees, industrial workers and others. Some of the products are simple tablets containing sodium chloride, others have enteric coating to permit passage of the material into the intestine before disintegration occurs, and still others contain additional substances such as minerals and vitamins. All are intended to provide sodium chloride and other factors to combat the harmful effects of excessive heat, exercise and sweating.

The need for the addition of vitamins, salts other than sodium chloride and minerals to salt tablets does not have sufficient evidence to justify their routine use until more satisfactory evidence is provided. They can therefore be dismissed from the casual prescribing practice.

However, there is strong evidence to support the administration of additional amounts of sodium chloride to the diet of those subject to strenuous exercise and excessive perspiration. Normally a person leading a sedentary life does not need salt in addition to the amount ordinarily placed in food. If copious sweating occurs, such an individual may require additional salt. Excessive perspiration is frequently encountered in those leading a strenuous physical life and may even occur during more moderate temperatures. However, such sweating entails loss of both water and salt, although the loss of salt varies with the amount of sweating and with conditions of acclimatization of the individual. Under special conditions man may become acclimated to hot weather, and work has shown that individuals exposed continuously to hot weather excrete less salt in their urine, compensating thereby for the loss of salt by sweat.

Sweat contains from 0.2 to 0.3 per cent, perhaps even up to 0.5 per cent, of sodium chloride. If a person perspires profusely considerable salt will be lost; for example, an individual might lose from 10 to 15 Gm. of salt. A man performing heavy work may lose a quart of sweat per hour. At the same time the chlorides in the blood decrease, and even though water is drunk it is not retained in the body and the body becomes dehydrated. Drinking too much water in the presence of dehydration created by loss of salt in water can cause water intoxication.

Under ordinary conditions the appetite or hunger for salt regulates the iutake. A simple criterion used by many to judge the amount of salt needed is the amount of water drunk and excreted per day. When the total water intake is under 1 gallon per day the amount of salt in the usual normal diet (about 16 Gm.) is claimed to be adequate to cover salt losses by sweating, but with water intake above 1 gallon usually more salt is needed. However, one Council consultant has found that in profuse sweating neither thirst nor salt hunger is a reliable guide. He and his associates found that rats and persons select salt and water so that a 0.6 per cent salt solution is ingested. The same investigator advocates drinking a 0.2 per cent salt solution when profuse sweating occurs, such as when a man performs heavy work. On the other hand, the man who performs light work probably needs no more salt than can be obtained in the ordinary diet. If additional amounts of salt are required they can be obtained by the use of well salted foods.

When Boulder Dam was being built, considerable enthusiasm was aroused concerning the supplying of additional amounts of salt, which compensated for the amount lost by the body and at the same time caused the men to drink more water. Smelters, iron workers and others who work in the presence of great heat have apparently been successfully given salted water to prevent heat cramps.

Symptoms of heat exhaustion and heat cramps are commonly associated with a salt deficit. Frequently victims suffer from severe cramps, often localized in the abdomen, the condition apparently being brought on by drinking large amounts of water at a time when the loss of sodium chloride from the body is excessive. The condition can be treated at once by the intravenous injection of sodium chloride solution, but it can be prevented by maintaining an adeqate salt intake with the water. So far as is known, no harmful effects follow the use of such salt water if it is properly prepared, although the use of salt in tablet form may irritate the stomach and cause nausea and vomiting and other disturbances in some persons. The amount of salt taken should be adjusted to actual need and, as is known, this need will vary with exercise and acclimatization. In areas where periods of hot weather are broken by cooler weather or where people are subjected to strenuous exercise only at periodic intervals, the need for salt supplement may exist only during these special periods, and this need may become less after the people become acclimatized. There is such great variance among different individuals according to their physiologic adjustments that it seems best to provide these persons with a 0.1 to 0.2 per cent drinking water solution when a need for extra salt seems indicated. Some may easily be satisfied merely by the addition of salt to their food. A 0.1 per cent solution may be made by dissolving about 1 Gm. of sodium chloride in each quart of water, or about 1 Gm. per liter.

Council on Foods and Nutrition

ACCEPTED FOODS

The following additional foods have been accepted as conforming to the Rules of the Council on Foods and Nutrition of the American Medical Association for admission to Accepted Foods.

GEORGE K. ANDERSON, M.D., *Secretary.*

PREPARATIONS USED IN THE FEEDING OF INFANTS (*See* Accepted Foods, 1939, p. 156)

Beech-Nut Packing Company, Canajoharie, N. Y.

BEECH-NUT STRAINED PEARS AND PINEAPPLE, consists of Bartlett pears, pineapple, sugar and water.

Analysis (submitted by manufacturer).—Total solids 16.72%, moisture (by difference) 83.28%, ash 0.22%, fat (ether extract) 0.31%, protein (N × 6.25) 0.34%, crude fiber 1.10%, carbohydrates other than crude fiber (by difference) 14.75%, calcium (as Ca) 0.014%, phosphorus (as P) 0.009%, iron total 0.54 mg. per hundred grams, iron "available" (bipyridyl method) 0.55 mg. per hundred grams, copper (McFarlane method) 0.15 mg. per hundred grams.

Calories.—18 per ounce; 63 per hundred grams.

Vitamins.—Vitamin A equivalent...26 U. S. P. units per hundred grams
Thiamine .....0.24 mg. per hundred grams
Ascorbic acid .....0.2 mg. per hundred grams
Riboflavin .....0.017 mg. per hundred grams
Niacin .....0.33 mg. per hundred grams

Beech-Nut Packing Company, Canajoharie, N. Y.

BEECH-NUT STRAINED PEARS, consists of pears, sugar and water.

Analysis (submitted by manufacturer).—Total solids 13.54%, moisture (by difference) 86.46%, ash 0.20%, fat (ether extract) 0.37%, protein (N × 6.25) 0.31%, crude fiber 1.02%, carbohydrates other than crude fiber (by difference) 11.64%, calcium (as Ca) 0.016%, phosphorus (as P) 0.009%, iron total 0.44 mg. per hundred grams, iron "available" (bipyridyl method) 0.33 mg. per hundred grams, copper (McFarlane method) 0.23 mg. per hundred grams.

Calories.—14 per ounce; 51 per hundred grams.

Vitamins.—Vitamin A equivalent..430 U. S. P. units per hundred grams
Thiamine .....0.011 mg. per hundred grams
Ascorbic acid .....0.5 mg. per hundred grams
Riboflavin .....0.015 mg. per hundred grams
Niacin .....0.27 mg. per hundred grams

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SATURDAY, SEPTEMBER 8, 1945

DEFICIENCY OF B VITAMINS IN MAN

A recent report of Keys and his associates [1] recounts their observations in an extensive investigation of the influence of a borderline deficiency and of an acute deprivation of some of the B group of vitamins in human subjects. Eight normal young men were given a diet providing a daily allowance of 3,300 calories, 75 Gm. of protein and 0.18 mg. of thiamine, 0.25 mg. of riboflavin, 3.5 mg. of niacin per thousand calories, with 5,000 units of vitamin A and adequate vitamin D. Four were given in addition 1 mg. of thiamine, 1 mg. of riboflavin and 10 mg. of nicotinic acid amide; these served as the supplemented control group. The experiment extended over one hundred and sixty-one days.

The urinary excretion of thiamine in both groups declined rapidly and in less than thirty days reached a more or less constant level. At the end of the study 1.1 per cent of the intake of thiamine of the restricted group appeared in the urine, whereas 8.5 per cent of that of the supplemented group was excreted through the kidneys. With respect to the loss of riboflavin in the urine, the value for the restricted group was 12.1 per cent and that of the control group 22.5 per cent. Many tests were made on physical fitness, psychomotor function, basal metabolic rate, cardiac function, emptying time of the stomach, glucose tolerance, sensory and intellective functions and personality evaluations; differences in the response of the two groups were not found on the basis of the foregoing evaluation or with respect to clinical ophthalmic or neuropsychiatric examinations. Only on the basis of the resting level of pyruvic acid in the blood was a difference detected; there was a slight but statistically significant increase in this value in the restricted group.

The study on acute deficiency followed immediately and continued for twenty-three days. Two previously restricted subjects continued on a diet containing negligible amounts of the three B vitamins concerned but otherwise adequate, and 2 were given the same food but with 1.5 mg. of thiamine, 1.5 mg. of riboflavin and 25 mg. of niacin per thousand calories; 2 previously supplemented subjects were given the deficient ration and two the same diet plus the added B vitamins. The most obvious change was seen in the restricted-deficient pair, who showed increasing anorexia from the seventh to the twenty-first day; similar, though somewhat delayed, signs were observed in the 2 men who had been in the supplemented group and now were on the deficient diet. Changes in the results of the objective tests were "surprisingly small . . . in view of the marked changes in general behavior and obvious signs of subjective distress." There were no changes in the tissues which are looked on as likely to furnish early signs of vitamin deficiencies, but again there were slight increases in the lactic and pyruvic acid levels of the blood toward the end of the test period. Deterioration in endurance and coordination was progressive, but there were few if any effects on strength, vision, hearing and speed.

The evidence indicates that thiamine is the limiting factor in these experiments. It appears that, though there was little deviation from the normal as a result of the restriction of thiamine, superimposition of acute deficiency indicates that the allowances in the first part of the study were less than adequate. From a practical point of view there still exists the need for more incisive tests for detecting incipient deficiency of the B vitamins, especially thiamine.

1. Keys, A.; Henschel, A.; Taylor, H. L.; Mickelsen, O., and Brozek, J.: Am. J. Physiol. **144**: 5 (June) 1945.

ALCOHOL PROBLEMS

In a report to its lay members the Research Council on Problems of Alcohol presents a summary of studies carried on during the period of 1939 to 1944.[1] A critical survey of the literature to 1941 on the effects of alcohol on the individual was completed by the New York University College of Medicine group headed by Norman Jolliffe and E. M. Jellinek. Volume I of this study (Yale University Press, 1942) is devoted to the etiology and treatment of abnormal drinking and to the mental and bodily disorders of chronic alcoholism. Workers at the Phipps Psychiatric Clinic of Johns Hopkins University under Dr. Curt P. Richter investigated the question of the appetite shown by animals and human beings for alcohol and whether this appetite gives any indication regarding the nutritional needs fulfilled by alcohol. When rats were given free access to purified minerals, vitamins, carbohydrates, fats and proteins, in separate containers, they made dietary selections which kept them in good health. For example, adrenalectomized rats ingested large amounts of sodium chloride and thereby kept themselves alive and free from symptoms of insufficiency; parathyroidectomized rats ingested large amounts of calcium solutions and

1. The Research Council on Problems of Alcohol, 60 East 42d Street, New York 17: Report on Studies 1939-1944: A Summary for Lay Members.

avoided phosphorus solutions, thereby keeping themselves alive and free from tetany; pancreatectomized rats ate large amounts of fat and avoided carbohydrate, thus helping to eliminate their symptoms of diabetes. This knowledge of the rat's ability to make advantageous dietary selections was utilized as a tool for the investigation of nutritional problems. The problems, according to these authors, were literally put to the rat, and the rat with its selections has usually given a definite answer. It was found that rats prefer alcohol to water in concentrations of 1 to 6 per cent. Under normal conditions they take only small amounts of alcohol in higher concentrations. By their preferences the rats placed alcohol in the group of substances which have nutritional value. When forced to take larger amounts of alcohol, rats reduced their food intake almost directly in proportion to the caloric intake obtained from the alcohol. Since the rats grew and thrived under these circumstances, the results indicated that alcohol may replace large amounts of food. Of primary importance is the fact that the total caloric intake did not surpass its normal level. Taste threshold and maximum preference concentrations were determined for 240 human subjects between the ages of 4 and 50 years. The taste thresholds were similar to those found in rats. The preference concentrations varied through a much wider range. While most children and adults did not like alcohol in concentrations above 15 per cent, about 8 per cent liked the alcohol up to and including 50 per cent. The investigators suggest that these youngsters who liked alcohol in such high concentrations might be the potential drinkers, while the others who disliked it, even in low concentrations, might thus, by their taste mechanisms, be kept from drinking larger amounts of alcohol.

Studies on the toxic factors in alcoholism were conducted by the New York State Psychiatric Institute. Studies of the nervous system in a series of rats which had been intoxicated with ethyl alcohol and reared with various diets, each diet deficient in a single vitamin of the B group, with the exception of nicotinic acid, revealed pathologic alterations characteristic of the deficiency of the corresponding vitamin; the addition of alcohol produced neither qualitative nor quantitative modifications of the pathologic picture. Studies of the central nervous system in a series of guinea pigs treated with alcohol and kept deficient in vitamin C did not show significant pathologic changes.

Drs. Lloyd H. Ziegler and Josef A. Kindwall studied the conditioned reflex treatment of 29 patients. Of the 29, 16 were considered successes and 13 failures. Although this is a preliminary study on a small number of persons, the authors are inclined to consider the conditioned reflex treatment a promising method of management of drunkards.

Surveys of facilities for the treatment of alcoholism revealed that hospital facilities for the care and treatment of alcoholic addicts in the United States are scanty and inadequate, and that those which exist are not always utilized to the best advantage. There has been little recognition of the need of diagnostic centers to determine the indications for therapy on an individual basis or of the need for facilities for adequate treatment. The authors feel that the diagnostic and therapeutic services, as well as research and professional education in this field, are functions of hospitals. Hospitals are best staffed and equipped to undertake the multiple phases of diagnosis and early medical treatment, particularly if the services of psychiatrists are available. Diagnostic clinics of the type established at Hartford and New Haven under the "Yale Plan" should prove of immense value as the first step toward securing the segregation of various types of patients.

In a study on the role of alcohol in the development of liver cirrhosis, Jolliffe indicates that the frequency of this condition is greater in the inebriate portion than in the temperate and abstinent part of the population but that it would be fallacious to assume from this fact alone that alcohol bears a direct causal relationship to cirrhosis. The attempts of numerous investigators to produce cirrhosis in animals by the experimental administration of alcohol have been uniformly unsuccessful. Jolliffe and Jellinek have computed the participation of inebriety in deaths from liver cirrhosis to be approximately 35 per cent. Thus, about 65 per cent of deaths from liver cirrhosis occur in noninebriates. Recent clinical studies have demonstrated that several other afflictions of the inebriate are caused by dietary deficiencies rather than by the direct action of alcohol. Among these are polyneuropathy, pellagra, some cardiovascular disturbances, niacin deficiency and encephalopathy and Wernicke's encephalopathy. A study of 198 inebriates with liver cirrhosis has failed to demonstrate any beneficial effect of high carbohydrate diets or of vitamin B_1 on the course of cirrhosis of the liver in the inebriate.

The Council's research program for the future proposes to follow two major lines: First, the committee will suggest problems and plans for research on the cause or causes (biologic and social) of alcoholism in man. The committee will include the study of effects of alcohol on various organs, functional processes and capacities. The second aspect of the program provides for establishment in the hospitals of medical schools of one or more research centers with facilities for diagnosis and treatment. Through such studies it may be possible in time to recognize early in life, especially in adolescents, the organism personality with subnormal resistance to alcohol in the hope of providing an effective method of preventing alcoholism.

Current Comment

THE DISCHARGE OF ARMY MEDICAL OFFICERS

During the last week several letters have been received signed by groups of physicians in various Army Medical Corps installations throughout the country urging that a different plan be adopted for the release of medical officers from the Army. Some of these letters have insisted that the American Medical Association should conduct a determined campaign in behalf of the technic they propose. One letter just received from Sheppard Field, Texas, signed by sixty-one medical officers, proposes that

> those civilian physicians below the age of 45 who have been taxing their strength by working as many as fourteen hours a day be allowed the privilege of serving their country during the remainder of the emergency. This would allow those physicians who have completed three or more years of service and/or those above the age of 38 an opportunity to return to their homes and their families. It should be noted that the eight hour day, as is common in the peacetime army, would be less taxing to their strength than the fourteen hour day, no matter what their physical status may be.

The letter further proposes that this utilization of civilian physicians be accomplished by joint action of the American Medical Association, the Procurement and Assignment Service and the Office of the Surgeon General. The American Medical Association officially or through any of its agencies has no authority or power to compel any action on the part of the Army authorities or the Office of the Surgeon General. THE JOURNAL hopes shortly to announce the revised system by which some thirteen thousand physicians of the Army medical department are to be released by the end of 1945 as stated in an announcement made last week by Surgeon General Kirk.

NONEXCRETION OF PENICILLIN IN BOVINE MILK

Bryan and his associates [1] have recently reported unsuccessful attempts to treat chronic streptococcic mastitis of cattle by intravenous injection of massive doses of penicillin. Seeley and his associates [2] of the Storrs Agricultural Experiment Station, Connecticut, made quantitative studies of the rate of excretion of intravenously injected penicillin into bovine milk. After the introduction of 500,000 Oxford units of a calcium salt of penicillin into the jugular vein of a Jersey heifer the animal was milked dry every half hour during the first six hour period and at hourly intervals thereafter, the final sample being taken twenty-four hours after the injection of penicillin. Preliminary tests had shown that, as measured by zone size milk enhances the in vitro action of penicillin against the test organism. With the cup technic, a zone of inhibition was not observed with any of the milk samples drawn from the injected heifer. From these negative results Seeley concludes that the lactating bovine mammary gland is not permeable to penicillin.

1. Bryan, C. S.; Horwood, R. E., and Huffman, C. F.: Vet. Med. **40**: 87, 1945.
2. Seeley, H. W., Jr.; Anderson, E. O.; Plastridge, W. N., and Pearson, Patricia: Science **102**: 44 (July 13) 1945.

LOCAL PROGRESS IN PUBLIC HEALTH

The 1944 annual report of the health department of the city of Racine [1] comes to hand coincidentally with the retirement of the city health officer after serving the city for almost fourteen years. His immediate predecessor served for over eight years. Both these health officials represented the same training, background and attitude toward public health work. Both worked in close cooperation with the local medical society and received the support of that society regularly. During these twenty-two years the city of Racine received six honor awards for outstanding health service in the Interchamber Health Conservation Contest sponsored by the American Public Health Association and the National Chamber of Commerce. Characteristic of the health service in Racine is an adequate budget in keeping with the budgets for other departments of the city government; the per capita appropriation for 1944 was $1.23. In that year other notable records were achieved. Not a single birth was attended by a midwife; every birth was reported by a physician; only 11 of the 1,147 resident births were delivered at home. Only 2 mothers died in childbirth, a rate of 1.3 per thousand births. The infant death rate was 21.9 per thousand births and there was not a single death from diarrhea and enteritis in children under 2. The city suffered not a single death from acute communicable disease. There was not an outbreak of illness traceable to any food product. Extensive laboratory services in the public health field were offered to the local physicians. This notable health record is accentuated by the fact that never at any time has the city of Racine had outside funds or subsidies either from state, from federal or from private sources, except for a small state participation in venereal disease control work. Racine is an industrial city with large numbers of families in the moderate income classification. The report establishes the success that can be achieved by local control, local financing and local leadership. The two health officers who served the city for more than two decades were not in either instance residents of Racine. They were both Wisconsin men, and the political leadership which brought them to the city, supported their work and cooperated with them was definitely and at times militantly local. Vociferous demands for federal financing, leadership and control are thus answered by the record of this city, doubtless not unique. Local initiative, local financing and local control have been sufficient in Racine to assure good progress in public health.

1. Annual Report, 1944, Department of Health, City of Racine, Racine, Wis.

MEDICINE AND THE WAR

ARMY

COMMISSIONS IN THE MEDICAL DEPARTMENT, REGULAR ARMY

1. The Surgeon General invites the attention of all Medical Department officers and former officers, other than those retired, of both male and female component corps, to War Department Circular 243, dated August 10, on the subject "Interest in Commissions in the Regular Army," a summary of which follows:

(*a*) "Present indications are that a number of outstanding officers who have proved their capabilities in this emergency will be needed in the Regular Army peacetime establishment. Until appropriate legislation is enacted, the War Department cannot announce the conditions which will govern selection of these officers or the number required. However, it is desired that officers who have served in the emergency, whether or not they are still on active duty, be given the opportunity of indicating their interest in obtaining a Regular Army commission. An officer making such a statement of interest may go off active duty or remain in the service without prejudice to his chances of being tendered a commission when legislation is enacted. It is the intention of the War Department that the fact that an officer has not remained in active service will not affect the grade to be offered or the position he will occupy on the promotion list.

(*b*) "The plan for selecting and integrating officers into the Regular Army officers corps, as well as the size and composition of that corps, will finally be determined by Congress. The War Department will recommend that these officers integrated into the Regular Army be of such age and physical condition as will permit them to serve for a reasonably long period before being retired. No officer will be appointed in a grade higher than that which he held in wartime.

(*c*) "The content of this circular will be brought to the attention of every officer at the earliest opportunity."

2. Officers currently on active military duty and who are interested in being considered for commission in the Regular Army, following enactment of appropriate legislation, may submit a statement of interest to their immediate commanding officer as outlined in the circular.

3. Officers and former officers other than those retired who have served since Dec. 7, 1941 and who have been relieved from active military duty under honorable conditions may submit their statement of interest as outlined in the circular direct to the Adjutant General, Washington 25, D. C.

4. The submission of a statement of interest in a Regular Army commission in no way obligates an officer to apply for such a commission at any time.

5. At such time when the policies establishing the conditions and procedures for selection and integration of officers into the Regular Army, Medical Department, are finalized, the Surgeon General will make immediate announcement in this publication.

ESTABLISH EIGHT CENTERS FOR TREATMENT OF TROPICAL SKIN DISEASE

Major Gen. Norman T. Kirk, Surgeon General of the Army, recently announced the establishment of eight centers specializing in the treatment of tropical skin disease. The centers will be devoted to the care of men returned from overseas, particularly the Pacific areas. The number of beds involved was not made public, as the program may be expanded or contracted as the need arises. The centers will be at Wakeman General Hospital, Camp Atterbury, Indiana; Brooke General Hospital, Fort Sam Houston, Texas; Madigan General Hospital, Fort Lewis, Wash.; Moore General Hospital, Swannanoa, N. C.; Harmon General Hospital, Longview, Texas, and in the U. S. Army General Hospitals at Camp Edwards, near Boston, Camp Butner, near Durham, N. C., and Camp Carson, near Colorado Springs.

ARMY AWARDS AND COMMENDATIONS

Major George A. Marks

The Legion of Merit was recently awarded to Major George A. Marks, formerly of Boston. The citation accompanying the award read "For exceptionally meritorious conduct in the performance of outstanding service in the Southwest Pacific Area from July 11, 1942 to June 13, 1944. Major Marks organized, trained and commanded a portable surgical hospital which was attached to an infantry regiment during the Papuan campaign. Under his exceptional leadership the unit moved in close proximity to front line troops and achieved a remarkable record in the care of the sick and wounded. It was essentially as a result of his professional ability and guidance that many lives were saved under the most difficult conditions of jungle warfare. Later, as a surgical consultant, he visited hospitals in advanced areas as an instructor and adviser. His knowledge and advice proved invaluable both in the treatment of casualties and in assisting and planning of additional facilities. By his outstanding ability in the field of surgery, Major Marks made a signal contribution to medical treatment in the Southwest Pacific Area." Dr. Marks graduated from Harvard Medical School, Boston, in 1928 and entered the service April 1, 1942.

Captain Richard O. Bagley

The Air Medal was recently awarded to Capt. Richard O. Bagley, formerly of San Francisco and now flight surgeon with the 51st Troop Carrier Squadron, based in Italy. The award was made for the part he played while the squadron was engaged in the evacuation of partisan wounded and Allied airmen who had evaded capture by the Germans from behind enemy lines in Yugoslavia. On one occasion Captain Bagley was flown at night in a C-47 troop carrier type aircraft without escort to an unfamiliar landing strip deep behind enemy lines in Yugoslavia to administer treatment to a seriously wounded and unconscious American air crewman. Through the treatment given by Captain Bagley at his destination, under the pressure of detection by the Germans at any time, and his continual treatment throughout the flight, the patient's condition was maintained until he was delivered to a base hospital in Italy. Dr. Bagley graduated from the University of Colorado School of Medicine, Denver, in 1939 and accepted a commission as 1st lieutenant in the Army Medical Corps in August 1942.

Lieutenant Colonel James W. Branch

The Bronze Star and Oak Leaf Cluster was recently awarded to Lieut. Col. James W. Branch, formerly of Hope, Ark., "for meritorious service in connection with military operations against an enemy of the United States in France, Belgium, Luxembourg and Germany during the period Dec. 1, 1944 to April 25, 1945. As surgeon of the 6th Armored Division, Lieutenant Colonel Branch has exhibited unusual aggressiveness, courage and ability in supervising and coordinating the medical activities of the division. His humanitarian efforts have greatly facilitated the prompt treatment and evacuation of Allied prisoners of war and the immediate alleviation of suffering of displaced persons. The faithful cooperation and careful devotion to duty displayed by him have been of material benefit and reflects great credit on himself and the Medical Corps." Dr. Branch graduated from the University of Arkansas School of Medicine, Little Rock, in 1935 and entered the service Feb. 3, 1941.

Captain Grover R. Fattic Jr.

Capt. Grover R. Fattic Jr., formerly of Hot Springs, Mont., was recently cited "for meritorious achievement in connection with military operations against the enemy on Luzon, Philippine Islands, from Feb. 1, 1945 to May 10, 1945. Captain Fattic did under the most trying difficulties of weather and enemy shell fire personally supervise all phases of the evacua-

tion of the wounded by litter and ambulance throughout the period. His cool determination, excellent judgment in the commanding and training of Medical Department soldiers, and the efficient evacuation and excellent treatment of the sick and wounded reflect great credit on him and on the military forces." Dr. Fattic graduated from the College of Medical Evangelists, Los Angeles, in 1938 and entered the service June 26, 1941.

Captain Jacob Thomas Farris

The Bronze Star, the Silver Star and the Purple Heart were awarded posthumously to Capt. Jacob Thomas Farris, formerly of Richmond, Ky. The citation accompanying the Bronze Star read "For meritorious service in connection with military operations against an enemy of the United States in ——— from June 6 to June 29, 1944." The Silver Star citation read "For gallantry in action against an enemy of the United States in ———, July 25, 1944. The initiative and courage displayed by this officer reflects great credit on himself and the armed forces of the United States." Dr. Farris graduated from Vanderbilt University School of Medicine, Nashville, Tenn., in 1940 and entered the service Aug. 26, 1941. He was killed by enemy fire in Normandy, France, near St. Lo, Aug. 3, 1944.

Colonel J. Guy Strohm

The Legion of Honor (officer) and the Croix de Guerre (with palm) was recently awarded to Col. J. Guy Strohm, formerly of Portland, Ore., for "his splendid work in command of the American Forty-Sixth General Hospital while this unit was supporting the First French Army." Dr. Strohm also shares in the Meritorious Service Unit Plaque awarded the American Forty-Sixth General Hospital some time ago and also the Legion of Honor (chevalier) and the Croix de Guerre (with star) for meritorious service as division surgeon of the Ninety-First Division during the first world war. Dr. Strohm graduated from Rush Medical College, Chicago, in 1910 and entered the service June 15, 1942.

Brigadier General Charles C. Hillman

Brig. Gen. Charles C. Hillman, Washington, D. C., was recently awarded the Legion of Merit for "service from August 1939 to August 1944. As chief of the Professional Service, Office of the Surgeon General, by his untiring effort and devotion to duty, he was responsible for the development of this service from a small prewar division to a large, well balanced organization. Under his direction physical standards were set up for the wartime army and professional direction was given to the blood plasma program and many other technical procedures which have been highly successful in the war effort." General Hillman graduated from Rush Medical College, Chicago, in 1911.

Colonel Charles C. Hubbard

The Bronze Star was recently awarded to Col. Charles C. Hubbard, formerly of Uniontown, Pa., for the part he played in the campaign to liberate the southern Philippines as chief of the Plans and Operations Division of the Medical Section, where, according to the citation, "he was largely responsible for the adequate medical service and evacuation which was available at all times for every sick and wounded individual in each of the Eighth Army operations." Dr. Hubbard graduated from Jefferson Medical College of Philadelphia in 1930 and entered the service in July 1941.

Major Joseph Robert Campbell

Major Joseph R. Campbell, formerly of the Mayo Foundation, Rochester, Minn., was awarded the Bronze Star recently and an oak leaf cluster to the Bronze Star. Both citations read, in part, "for meritorious and direct support of combat operations." Dr. Campbell is division psychiatrist for the 3d Infantry Division in Germany. He graduated from the University of Manitoba Faculty of Medicine, Edmonton, Alberta, in 1937 and entered the service Aug. 21, 1942.

Captain Jackson C. Neavles

Capt. Jackson C. Neavles, formerly of Webster Groves, Mo., was recently awarded the Bronze Star for meritorious service in action with his army airborne division in Holland. He also served as a battalion surgeon with his unit during the Normandy campaign. Dr. Neavles graduated from Washington University School of Medicine, St. Louis, in 1942 and entered the service April 25, 1943.

Captain Charles H. Burnett

Capt. Charles H. Burnett, formerly of Boston, was recently awarded the Bronze Star for meritorious achievements in connection with military operations in the Mediterranean Theater of Operations. Describing Captain Burnett's work from Feb. 11, 1944 to May 8, 1945 the citation pointed out that "by virtue of his zeal and scientific skill he carried out during this period field studies of blood and blood substitutes which were of outstanding value in promoting the correct usage of these agents in the treatment of the seriously wounded. His untiring efforts and devotion to duty reflect great credit on himself and on the Medical Corps of the Army of the United States." Dr. Burnett graduated from the University of Colorado School of Medicine, Denver, in 1937 and entered the service Aug. 22, 1942.

Colonel Earle Standlee

The Cross of Knight Commander, Order of the Crown of Italy, was recently awarded to Col. Earle Standlee, formerly of Washington, D. C., in recognition of his meritorious services in Italy during the war. Dr. Standlee graduated from Baylor University College of Medicine, Dallas, in 1925 and entered the service June 1, 1925.

Lieutenant Colonel Luke A. Mulligan

Lieut. Col. Luke A. Mulligan, formerly of Leonia, N. J., as commanding officer of the 16th Field Hospital received for his unit the Meritorious Service Unit Plaque for exceptional service during the period from Dec. 21, 1944 to March 9, 1945. The 16th Field Hospital went to the aid of those in Bastogne and Avranches. Dr. Mulligan graduated from Long Island College of Medicine, Brooklyn, in 1929 and entered the service July 26, 1942.

Captain Charles H. Hall Jr.

The Bronze Star was recently awarded to Capt. Charles H. Hall Jr., formerly of Brooklyn, for meritorious services in support of combat operations in Italy. Captain Hall's medical detachment took part in the engagements of Africa, Salerno, Volturno River, Cassino, Anzio Beach, Rome, Florence and the Gothic line. He graduated from Long Island College of Medicine, Brooklyn, in 1939.

Major Merrill B. Rubinow

Major Merrill B. Rubinow, formerly of Manchester, Conn., was recently awarded the Bronze Star for heroic action on the Western front. His unit, the 37th Medical Battalion of the Third Army, was the recipient of a Meritorious Service Unit Citation. Dr. Rubinow graduated from Long Island College of Medicine, Brooklyn, in 1942 and entered the service Sept. 12, 1943.

Colonel Martin E. Griffin

The Cross of Knight Commander, Order of the Crown of Italy, was recently awarded to Col. Martin E. Griffin, formerly of Washington, D. C., in recognition of his meritorious service during the Italian campaign. Dr. Griffin graduated from the State University of Iowa College of Medicine, Iowa City, in 1925 and entered the service June 1, 1925.

Lieutenant Colonel Joseph O. Boydstone

The Bronze Star and Purple Heart were recently awarded to Lieut. Col. Joseph O. Boydstone, formerly of Little Rock, Ark., during the campaign of the division in France, Belgium, Luxembourg and Germany. Dr. Boydstone graduated from the University of Arkansas School of Medicine, Little Rock, in 1932 and entered the service Sept. 20, 1940.

Captain Regis F. Asselin

Capt. Regis F. Asselin, formerly of Detroit, was recently awarded the Bronze Star for distinguished and meritorious service, over and beyond the call of duty, in accomplishing malaria control in a highly malarial area. Dr. Asselin graduated from the Long Island College of Medicine, Brooklyn, in 1939 and entered the service Sept. 5, 1942.

NAVY

TRANSFER OF RESERVE MEDICAL OFFICERS TO THE REGULAR UNITED STATES NAVY

New and notable opportunities for outstanding medical careers in the Navy have now been developed. Reserve medical officers who have given thought to the matter of transferring to the Medical Corps of the regular Navy should have full information about the opportunities and inducements warranting such a move.

The Medical Corps of the Navy must be greatly enlarged to provide for postwar officer requirements, and applications for transfer of reserve officers are invited and urged.

The development of the residency-type graduate training program in United States Naval Hospitals, described again in THE JOURNAL September 1, is of importance to medical officers in all age groups interested in specialization.

The American College of Surgeons has recently surveyed and officially approved thirty-two United States naval hospitals for graduate training in various of the surgical specialties.

The Council on Medical Education and Hospitals of the American Medical Association, acting jointly with the American boards, has surveyed and approved for residency training in medical and surgical specialties three of these hospitals and at this moment is engaged in a similar survey of thirty-seven additional naval hospitals for the same purpose.

Officers in the older age groups already trained and classified as specialists will fit into key positions in the educational program as teachers and leaders as well as clinicians. Younger officers, when assigned for duty in these naval hospitals, and also in many instances in unsurveyed and unclassified activities, will be in a position to train and perfect themselves in the specialty of their choice and to have credit for the time so spent applied toward applications for American board certification and fellowship in the American College of Surgeons or the American College of Physicians, as well as later election to national special societies.

In other words, a medical career in the Navy now affords opportunities for training, for attainments and for clinical and teaching activities as well as for honors quite comparable to those of civilian practice and limited only by an individual's initiative and ability.

Every medical officer has been classified and graded in the Professional Qualification Section of Personnel Division, Bureau of Medicine and Surgery, together with a listing of any expressed preferences for special training or experience. This will expedite all matters of appropriate assignment and proper utilization of officers in peacetime activities.

It is the intention of the Bureau of Medicine and Surgery to make every effort to assign reserve medical officers transferring to the Medical Corps of the Navy to postgraduate instruction in naval hospitals at the earliest practicable date consistent with the exigencies of the service.

The bureau intends also to resume extensively the use of the civilian medical centers for postgraduate training of medical officers of the Navy.

It is reemphasized that the Navy is in need of a large number of additional medical officers in the Medical Corps of the regular Navy and that interested reserve officers desiring further information on the subject, or wishing to make application for transfer, should communicate accordingly with their commanding officers at the earliest possible moment.

NAVY AWARDS AND COMMENDATIONS

Lieutenant Lewis D. Norris

Lieut. Lewis D. Norris, formerly of Minneapolis, was recently awarded the Bronze Star. The citation accompanying the award read "For meritorious achievement in connection with operations against the enemy on Iwo Jima, Volcano Islands, from Feb. 24 to March 16, 1945. Throughout the active phase of the operations Lieutenant (junior grade) Norris, as battalion surgeon with a Marine Division, displayed outstanding professional skill, sound judgment and courage in the care of our own and enemy wounded. All sick and wounded prisoners of war captured within the division's zone of action were brought into the aid station of his battalion. Because of his untiring initiative, devoted courage and skilful professional ability he was a constant inspiration to his men and contributed materially to the success of the operation. His conduct was in keeping with the highest traditions of the United States Naval Service." Dr. Norris graduated from the State University of Iowa College of Medicine in 1943 and entered the service April 8, 1944.

Lieutenant Commander George J. Miller

Lieut. Comdr. George J. Miller, formerly of Hempstead, N. Y., was awarded the Silver Star by Lieut. Gen. H. M. Smith for "conspicuous gallantry and intrepidity while acting as battalion surgeon of a marine artillery battalion in action against the Japanese on Saipan in the Mariannas Islands in the summer of 1944." With complete disregard for his own safety and without shelter, Commander Miller gave medical treatment and supervised the evacuation of 275 casualties from his battalion and adjacent units. Dr. Miller graduated from the Long Island College of Medicine, Brooklyn, in 1940 and entered the service July 25, 1941.

MISCELLANEOUS

WARTIME GRADUATE MEDICAL MEETINGS

The following subjects and speakers for Wartime Graduate Medical Meetings have just been announced:

California

Letterman General Hospital, San Francisco: Surgery of the Hand, Dr. Edmond Dana Butler, September 15; Diagnosis and Treatment of Diabetes Mellitus and Diabetic Coma, Dr. H. Clare Shepardson, September 29.

Station Hospital, Camp Stoneman, Pittsburg: Diagnosis and Treatment of Various Skin Diseases, Dr. John Graves, September 29.

Hammond General Hospital, Modesto: Thoracic Surgery, Dr. Brodie Stephens, September 19.

U. S. Naval Hospital, Mare Island: Subacute Bacterial Endocarditis: Diagnosis and Treatment with Penicillin, Dr. Henry D. Brainerd, September 14.

Station Hospital, Fort Ord: Early Ambulation of Surgical Patients, Dr. H. Glenn Bell, September 29.

UNRRA LAUNCHES ANTIMALARIA PROGRAM IN GREECE

As part of an all out drive against the critical increase of malaria in Greece, the largest air borne antimalaria program yet launched in Europe will soon be undertaken by UNRRA in Greece in cooperation with the Greek government. Roy F. Hendrickson, acting director general of UNRRA, stated that ten specially equipped planes are being sent to that country to be used in spraying mosquito breeding areas with DDT. According to the UNRRA chief medical officer in Greece, Dr. J. Balfour Kirk, there are some areas in the country where 100 per cent of the population is infected with malaria fever. Data now available indicate that 40 to 50 per cent of the country will be infected during the season which lasts from April through October. The present number of victims approaches the three million mark. Prior to the war the estimated average number of cases in Greece was approximately 50,000 per year. In addition to the planes and other equipment necessary for the treatment of malaria swamps, UNRRA will aid Greek health officials in the work of spraying 750,000 homes with DDT.

ORGANIZATION SECTION

Washington Letter

(From a Special Correspondent)

Sept. 3, 1945.

Formation of Committee to Assist Veterans Seeking Medical Careers

District of Columbia medical and nursing school heads have formed a committee under Dr. Paul F. Dickens, District chairman of the WMC Procurement and Assignment division, to assist veterans seeking to study medicine, pharmacy, dentistry, nursing and allied science. The committee includes Dr. Walter A. Bloedorn, dean of George Washington University School of Medicine; Father David V. McCauley, dean of Georgetown School of Medicine; Dr. John W. Lawlah, dean of Howard University College of Medicine; Dr. John P. Burke, dean of Georgetown University School of Dentistry; Dr. Roger M. Choisser, head of George Washington University School of Medical Technicians; Sister Marie Gerarda, superintendent of nurses at Georgetown University Hospital; Mrs. Helen Shoemaker, nurses' superintendent at Sibley Memorial Hospital, and Lloyd W. Hazelton, executive office of George Washington School of Pharmacy.

The Army expects to release 13,000 doctors by the end of 1945 and the Navy 8,200 by September 1946, officials of both services have told the House Military Affairs Committee. Surgeon General Kirk also revealed that the Army will discharge 3,500 of its 15,000 dentists and 25,000 of its 56,000 nurses by December. He stated that the Army has 45,000 doctors for its 400,000 patients in army hospitals throughout the world.

The Navy plans to cut its present 3,389,000 strength to 500,000 enlisted men by September 1946 and will reduce its medical staff from 14,000 to 5,800 by that time, stated Capt. H. G. Hopwood, special assistant chief of naval personnel. In the next three months the Navy will release 1,000 nurses and 1,000 doctors. The Navy will shortly change its point discharge system.

Former WAC Staff Director Reports to General Bradley

Onetime executive secretary to the medical director of the Veterans Administration for twelve years, and for ten years an attorney in the solicitor's office, Lieut. Col. Mary Agnes Brown, former WAC staff director in the Pacific, has reported to Gen. Omar N. Bradley, Administrator of Veterans' Affairs, to serve as an adviser on matters pertaining to women veterans. More than 300,000 women are either serving or are already released from the armed forces. Brig. Gen. Frank T. Hines, who has been named American ambassador to Panama, was honored at a reception in the Mayflower Hotel, given by Edward B. Scheiberling, national commander of the American Legion.

Enrolment of Servicemen in Medical Schools

Despite the efforts of the War Manpower Commission to encourage veterans to enroll in medical and dental schools, the Army and Navy have enrolled more than 1,000 servicemen as first year medical students. This action is said to have been taken because of commitments to the schools and to the men. The services will probably keep them in school for only one semester. The Navy announced that, although its V-12 program will be liquidated starting November 1, 1,500 V-12 students are entering medical and dental schools for one year. The majority are enrolled in medicine. The Army has 400 enrolling in medical schools this fall under the Army Specialized Training Program. Some 5,700 other medical and 1,450 dental students in the Navy V-12 program will remain on active duty until the end of the semester now current or starting before November 1. An Army spokesman said that the Army was obligated under the act setting up the Specialized Training Program to continue it until Congress calls a halt. Veterans, meantime, complain that they have been told they cannot get into medical school under the G. I. bill for a year or more because schools are full. A representative of the War Manpower Commission Procurement and Assignment board estimates that 75 to 80 per cent of medical schools are occupied by Army and Navy students. Ten days ago the WMC announced plans "to enroll immediately 12,000 students for medical, dental, premedical and predental courses beginning this fall from among veterans now being discharged from the armed forces." This recent check discloses that medical schools are filled and cannot take the large number of students the WMC said could be enrolled.

Plight of Disabled Veterans Being Studied

Government leaders are giving more and more thought to care for disabled war veterans, who will carry a double load in making their readjustment to civilian life. Those departments charged with work on behalf of such veterans are studying advanced methods of treatment and job finding. Business and government agencies, such as the Army Map Service and Bertram's Pipe Factory in Washington, are already making it a point of hiring disabled veterans. The public is also making a conscious effort to assist in their readjustment.

Army Medical Service May Be Transferred

The proposed reorganization of the War Department is said to include plans to take the Surgeon General's Office, along with the Adjutant General's Office and the Provost Marshal General's Office, out of the Army Service Forces and place them directly under the Secretary of War.

Committee on Scientific Exhibit

MEDICAL MOTION PICTURES

Medical motion pictures are available on a loan basis from the American Medical Association to medical societies, medical schools, hospitals and other scientific groups. Requests should be instituted as far in advance as possible, so that the proper reservations can be made. The exact shipping addresses and dates should be given at the time of the request. Responsibility for the projection and care of the film must be borne by the individual or organization which is borrowing it. The American Medical Association does not have projectors available for loan.

The only expense incurred is that of transportation both ways. However, careless handling resulting in serious damage may be charged to the borrower.

Requests should be sent to the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago 10.

ANESTHESIA

Dynamics of Respiration (1938; revised 1944)
Silent. Color. 16 mm., 3 reels, 400 feet each.
Running time about 40 minutes.
Dynamics of respiration showing normal respiration, respiration in various stages of anesthesia and in different pathologic conditions.
Prepared by the Departments of Anesthesia, Radiology and Photography, University of Wisconsin Medical School, Madison, for the Special Exhibit on Anesthesia of the American Medical Association.

Pediatric Anesthesia (1944)
Silent. Color. 16 mm., 2 reels, 400 feet each.
Running time 30 minutes.
For use in demonstrating the technic of anesthesia in children.
Prepared by Dr. M. Digby Leigh, Department of Anesthesia, Children's Memorial Hospital, Montreal, Que., Canada.

Regional Anesthesia for Operations on the Neck (1938)
Silent. 16 mm., 1 reel, 400 feet.
Running time about 16 minutes.
Film shows detail of technic of anesthesia for operations on the neck.
Prepared by Dr. Ralph M. Tovell, Section on Anesthesia, the Mayo Clinic, Rochester, Minn., for the Special Exhibit on Anesthesia of the American Medical Association.

Signs of Inhalation Anesthesia (1938)
Silent. 16 mm., 2 reels, 300 feet each.
Running time about 25 minutes.
Details of signs of inhalation anesthesia with charts presented by Dr. Arthur E. Guedel, Los Angeles.
Prepared by Dr. Henry S. Ruth and Dr. J. Harvey Sigafoos, Department of Anesthesia, Hahnemann Hospital, Philadelphia, for the Special Exhibit on Anesthesia of the American Medical Association.

Technic of Blocking Sacral Nerve (1938)
Silent. 16 mm., 1 reel, 400 feet.
Running time about 15 minutes.
Film shows details of technic for blocking sacral nerve.
Prepared by the Section on Anesthesia, the Mayo Clinic, Rochester, Minn., for the Special Exhibit on Anesthesia of the American Medical Association.

The Technic of Carbon Dioxide Absorption in Anesthetic Atmospheres (1938)
Silent. 16 mm., 2 reels, 400 feet each.
Running time about 30 minutes.
Details of technic for absorbing carbon dioxide in anesthetic atmospheres.
Prepared by Departments of Anesthesia and Photography, University of Wisconsin Medical School, Madison, for the Special Exhibit on Anesthesia of the American Medical Association.

The Role of Carbon Dioxide in Convulsions During Anesthesia (1942)
Silent. 16 mm., 1 reel, about 200 feet.
Running time about 7 minutes.
The picture shows convulsions during anesthesia and their control.
Prepared by Departments of Anesthesia, Radiology and Photography, University of Wisconsin Medical School, Madison.

PHYSICAL MEDICINE

Aids in Muscle Training (1938)
Silent. 16 mm., 1 reel, 300 feet.
Running time about 12 minutes.
Demonstration of sling suspension exercises for the upper and lower extremities, graded exercises on a powdered board for the lower extremities and three kinds of "walkers" for reeducation exercises.
Prepared by the Council on Physical Medicine, American Medical Association, 535 North Dearborn Street, Chicago.

Contraction of Arteries and Arteriovenous Anastomoses (1935)
Silent. 16 mm., 1 reel, 250 feet.
Running time 10 minutes.
This film visualizes the contraction of arteries and arteriovenous anastomoses as seen through a glass chamber installed in a rabbit's ear.
Prepared by Dr. E. R. Clark, University of Pennsylvania School of Medicine, Philadelphia.

Effects of Heat and Cold on the Circulation of the Blood (1933)
Silent. 16 mm., 1 reel, 300 feet.
Running time 12 minutes.
Demonstration of the effect of heat and cold on circulation as seen through a glass chamber installed in a rabbit's ear.
Prepared by Dr. E. R. Clark, University of Pennsylvania School of Medicine, Philadelphia.

Effects of Massage on the Circulation of the Blood (1933)
Silent. 16 mm., 1 reel, 200 feet.
Running time 8 minutes.
Demonstration of the effect of massage on circulation as seen through a glass chamber installed in a rabbit's ear.
Prepared by Dr. E. R. Clark, University of Pennsylvania School of Medicine, Philadelphia.

Massage (1938)
Silent. 16 mm., 1 reel, 100 feet.
Running time 4 minutes.
Demonstration of technic of massage, describing the various movements and why they are performed in a given way.
Prepared by the Council on Physical Medicine, American Medical Association, 535 North Dearborn Street, Chicago.

Occupational Therapy (1938)
Silent. 16 mm., 2 reels, 450 feet.
Running time 12 minutes.
This film demonstrates occupations that may be prescribed by physicians to motivate and control the desired physical or mental activity of the patient and assist in his adjustment to long hospitalization. A section on cerebral palsy is included, picturing indirect muscle training through prescribed activity and stressing the importance of early treatment to prevent growth of faulty habit patterns.
Prepared by the Council on Physical Medicine, American Medical Association, 535 North Dearborn Street, Chicago.

Underwater Therapy (1938)
Silent. 16 mm., 1 reel, 400 feet.
Running time about 16 minutes.
Presentation of therapeutic use of large and small exercise pools, Hubbard tanks and home made tanks, and demonstration of types of exercises given in cases such as infantile paralysis, cerebral palsy and postoperative congenital dislocation of the hip.
Prepared by the Council on Physical Medicine, American Medical Association, 535 North Dearborn Street, Chicago.

OTHER SUBJECTS

Angina Pectoris (1942)
Sound. Color. 16 mm., 2 reels, 1,600 feet each.
Running time about 1½ hours.
A Summary of Objective Studies. (Part I: Clinical Characteristics. Part II: Physiology. Part III: Pathology. Part IV: Treatment.)
Produced by Dr. Joseph E. F. Riseman, Boston.

Back to Normal (1945)
Sound. 16 mm., 1 reel, 550 feet.
Running time about 16 minutes.
This film shows how science makes it possible for those who lose their limbs by amputation or accident to adjust themselves to old or new occupations. Artificial limbs and special training centers are the means to this goal.
Prepared by British Information Services, 30 Rockefeller Plaza, New York 20.

Blood Transfusion
Silent. 16 mm., 1 large reel, 1,200 feet.
Running time about 45 minutes.
Three methods of blood transfusion illustrated in detail.
Sponsored by the Blood Transfusion Betterment Association, 39 East 78th Street, New York.
Produced by Mr. Joseph P. Hackel, New York.

Eyes for Tomorrow (1944)
Sound. 16 mm., 1 reel.
Running time about 15 minutes.
This stresses good general health as a prerequisite for good eyesight. It also deals with the importance of antepartum care as a means of reducing the amount of blindness caused by syphilis and gonorrhea; the conservation of vision among school children; the use of sight-saving classes for children with seriously defective vision; the necessity for regular eye examinations; methods of treating glaucoma and trachoma, and the eye hazards of industry.
Produced by National Society for the Prevention of Blindness, Inc., 1790 Broadway, New York 19.

Keep 'Em Out (1942)
Sound. 16 mm., 1 reel, 325 feet.
Running time about 15 minutes.
The film describes the economic damage and health hazards caused by rats.
Produced by Stark Films, 537 North Howard Street, Baltimore 1, in cooperation with U. S. Public Health Service.

Medical History in Clinical Teaching (1940)
Silent. 16 mm., 2 reels, about 300 feet each.
Running time about 25 minutes.
History of physical diagnosis with scenes from the lives of Hippocrates, William Harvey, Rev. Stephen Hales, Leopold Auenbrugger von Auenfrug, René Théophile, Hyacinthe Laënnec and Wilhelm Konrad Roentgen.
Prepared by Department of Cardiology, Woman's Medical College of Pennsylvania, Philadelphia.

Physical Diagnosis (a presentation of advanced and unusual cases with physical signs demonstrable by inspection) *(1942; revised 1945)*
Silent. Color. 16 mm., 17 reels, 400 feet each.
Following are the subjects and the approximate running time of the various reels:
Abnormalities in Gait. Reel 1. 15 minutes.
Other Types of Involuntary Movement. Reel 2. 15 minutes.
Endocrine Diseases with Characteristic Physiognomy. Reels 3 and 4. 30 minutes.
Abnormalities in Color. Reel 5. 15 minutes.
Head and Face. Reels 6, 7 and 8. 45 minutes.
Neck. Reel 9. 15 minutes.
Chest. Reels 10 and 11. 25 minutes.
Displacement of the Apical Impulse. Reel 12. 10 minutes.
Abdomen, Back and Perineum. Reels 13 and 14. 25 minutes.
Extremities. Reels 15, 16 and 17. 40 minutes.
Produced by Dr. Gordon B. Myers, Dr. Fred J. Margolis and Dr. Muir Clapper, Wayne University College of Medicine, Detroit.

Syphilis—A Teaching Film (1942)
Sound. 16 mm., 3 reels.
Part A. Diagnosis of Early Syphilis, 18 minutes.
Part B. Diagnosis of Latent Syphilis, 14 minutes.
Part C. Management of Syphilis, 29 minutes.
Prepared by United States Public Health Service.

The Hygiene of Swimming
Silent. 16 mm., 1 reel, 400 feet.
Running time 15 minutes.
This picture shows that man is not adapted to aquatic life and illustrates the danger of infection to the ear, nose and throat, the danger of diving in shallow water and the danger of chilling from cold water.
Prepared by Dr. H. Marshall Taylor, Jacksonville, Fla., for the Section on Laryngology, Otology and Rhinology of the American Medical Association.

The Life History of the Rocky Mountain Wood Tick (1939)
Silent. Color. 16 mm., 2 reels, 400 feet each.
Running time about 25 minutes.
The tick is listed as the vector of (1) Rocky Mountain Spotted Fever, (2) tularemia, (3) Colorado tick fever, (4) American Q fever and (5) tick paralysis. There are many views of landscapes showing the type of foliage wherein the ticks are commonly found, as well as of the various wild and domesticated mammals which serve as hosts for the blood meals necessary for the development of the ticks.
Produced by The Rocky Mountain Laboratory of the U. S. Public Health Service, Hamilton, Mont.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Personal.—Dr. Thomas Addis, professor of medicine, Stanford University School of Medicine, San Francisco, was on July 17 chosen a fellow of the Royal College of Physicians of Edinburgh.

Fund Named for Ruby Cunningham.—Almost $7,000 has been donated to establish a memorial in honor of Dr. Ruby L. Cunningham, late senior physician at the Ernest V. Cowell Memorial Hospital, Berkeley. The fund will be known as the Ruby L. Cunningham Fund and will be used in connection with the student health service for "extraordinary demands" which could not be met through ordinary channels.

Robert Millikan Retires.—Robert A. Millikan, Sc.D., has retired as administrative head of the California Institute of Technology, Pasadena. He will continue as vice president of the board of trustees and assist the president of the board in public relations work and institutional development as well as devote much time to his own research and writing. Max Mason, Sc.D., Pasadena, has also retired as a member of the executive council.

Regulation Concerning Hycodan.—Hycodan will be treated under the state narcotic act as codeine, with the exception of exemption, according to recent regulations of the state division of narcotic enforcement. Prescriptions calling for hycodan in combination with other nonnarcotic medicinal ingredients may be written on the ordinary single prescription blanks of physicians but may not be refilled. Hycodan is not exempt in any amount from the writing of a prescription by the physician prescribing it.

DISTRICT OF COLUMBIA

Clinic for Alcoholics.—As a step toward the formation of a mental hygiene clinic service the District of Columbia Health Department has organized a clinic for alcoholic addicts. Dr. Michael M. Miller, a member of the staff of St. Elizabeths Hospital, who formerly developed a clinic for alcoholic addicts in Cleveland, has been secured on a volunteer basis for two clinic sessions weekly. Other personnel are on a volunteer basis and have been recruited from Alcoholics Anonymous. Service in the local health department must meet Civil Service requirements and the arrangement, therefore, in regard to the staffing of the clinic has been adopted as a temporary measure. Patterned in a general way after the Yale University Clinic for Alcoholics, the clinic saw 275 patients between August 6, the day of its opening, and August 20. Acute alcoholic addicts are referred to the Gallinger Municipal Hospital for detoxication purposes, following which the psychiatric clinic service takes over and uses members of Alcoholic Anonymous for whatever moral support the group can give to the patient. Nonacute cases, however, not requiring institutionalization are carried by the use of sedation and stimulants as required.

ILLINOIS

Personal.—Dr. Robert K. Campbell, Springfield, medical director of St. John's Sanatorium, crippled children's school and hospital, on August 7 observed his twenty-fifth anniversary as a member of the staff.

Chicago

Talk on Cancer.—A series of popular medical lectures at the Museum of Science and Industry (THE JOURNAL, July 28, p. 962) has been so acceptable that, by request of the audience, one on cancer was added August 29 with Dr. Herbert E. Schmitz, professor and head of the department of obstetrics and gynecology at Loyola University School of Medicine, as the speaker. Dr. H. William Elghammer, professor of pediatrics at Loyola, gave a talk August 22 on "Rheumatic Fever in Childhood."

Herbert Kobes Named Director of Crippled Children's Services.—Dr. Herbert R. Kobes, director of medical services, Maine Department of Health and Welfare, Augusta, Maine, has been appointed director of the division of services for crippled children of the University of Illinois, with central offices in Springfield at 1105 South Sixth Street. He succeeds Lawrence J. Linck, who recently resigned to become executive director of the National Society for Crippled Children (THE JOURNAL, August 11, p. 1117).

A New Residency in Anesthesiology.—The surgery department of the University of Chicago School of Medicine is establishing a new three year residency in anesthesiology. A part of the time will be devoted to research and the remainder to clinical work. This residency will be under the supervision of both Dr. Huberta M. Livingstone, associate professor of surgery and director of anesthesiology, and Dr. Eugene M. K. Geiling, professor and chairman of the department of pharmacology. Requests for information regarding this residency should be sent to Dr. Livingstone.

INDIANA

One Hundred and One Years of Age.—Dr. Henry C. Rogers, Rockville, observed his one hundred and first birthday, August 16. Dr. Rogers graduated at the Indiana Medical College, Indianapolis, in 1876.

New Board of Health and Hospitals.—Dr. Herman G. Morgan was recently appointed secretary of the newly created Indianapolis Board of Health and Hospitals and director of public health. The board was established by the last legislature and supplants two separate boards. Other appointees include Drs. Charles W. Myers, director of hospitals; Kenneth G. Kohlstaedt, medical director of the Indianapolis City Hospital; James D. Peirce Jr., assistant director of the hospital, and Gerald F. Kempf, superintendent of preventive medicine.

Health Center Under Construction.—Under the direction of the Indianapolis board of health, the construction of a health center building as an adjunct to Flanner House was begun on June 13. The building will cost approximately $105,000, with an additional $20,000 to be spent for equipment, and will contain clinic, examination and x-ray rooms and offices for staff members. The work will be tied up with the city's slum clearance project, and, in addition to diagnosis of the causes, particularly from the standpoint of housing and environment, a case-finding program of tuberculosis, venereal diseases, antepartum medicine, infant and child health, dental and general medicine will be conducted.

MINNESOTA

Personal.—Dr. Ruth Evelyn Boynton, Minneapolis, was recently elected president of the Minnesota Department of Health.——Dr. Elmer Mendelssohn Jones, St. Paul, has been appointed a member of the state board of medical examiners to succeed the late Dr. Max W. Alberts, St. Paul.——Dr. David E. Ellison has resigned as venereal disease control officer of the Minneapolis Department of Health, effective September 1.

Sentenced for Operating Clinic in "Bloodless Surgery."—On July 17 "Dr." Albert Henry Broden, "naturopathic physician," Milwaukee, pleaded guilty to an information charging him with practicing healing without a basic science certificate in the district court of Hennepin County, Minn. Broden was sentenced to a term of one year in a Minneapolis workhouse, the sentence being stayed on condition that Broden "immediately leave the state and stay out." Broden was arrested by Inspector Bernath of the Minneapolis police department after a joint investigation by the Minnesota State Board of Medical Examiners and the Minneapolis police department on July 14 at the Hotel Andrews, where he was conducting a so-called "clinic" in "bloodless surgery." Broden admitted to the court that he charged $150 for each person who attended his clinic. His records show that he obtained $600 from three chiropractors and one masseur. Broden, who represented himself as a "naturopathic physician," was arrested in Duluth in 1929 and convicted even though he took his case to the supreme court of Minnesota. He is said to have three convictions in Texas for violating the medical laws.

MISSOURI

William Cramer Dies.—William Cramer, Ph.D., research associate, Barnard Free Skin and Cancer Hospital, St. Louis, died in Denver August 10, aged 67. Dr. Cramer, research associate in cytology, Washington University School of Medicine, St. Louis, had been senior member of the scientific staff for the Imperial Cancer Research Fund in London from 1915 to 1939, when he came to the United States.

Medical Curriculum Revised.—All didactic work of the third year at Washington University School of Medicine, St. Louis, will be consolidated into a single conjoint course in medicine. This means that a disease will be discussed simul-

taneously by all of the departments concerned and the student will be given a complete picture of the disease. Another innovation is the rearrangement of the clerkships of the third and fourth years so as to make possible a clinical clerkship in preventive medicine. To do this the third year has been divided into quarters instead of trimesters as in the past. The elective quarter in the senior year remains. These departures are the result of a survey made by a subcommittee of the committee on medical education at the medical school.

MONTANA

State Medical Election.—Dr. Maurice A. Shillington, Glendive, was named president-elect of the Montana State Medical Association at its annual meeting July 15, and Dr. Sidney A. Cooney, Helena, was inducted into the presidency. Dr. Walter H. Stephan, Dillon, is vice president, and Dr. Raymond F. Peterson, Butte, was reelected secretary-treasurer.

Honorary Membership Awarded for Cancer Work.—The Montana State Medical Association has awarded honorary membership to Mrs. H. W. Peterson, Billings, field commander, northwest region, Field Army, American Cancer Society, and president of the Public Health League of Montana, for "unselfish devotion and outstanding accomplishments of the officers and members of the Montana division, American Cancer Society, in the field of cancer prevention and public health." The presentation was made to Mrs. Peterson by Dr. James C. Shields, Butte, president of the state medical association, at a banquet of its house of delegates.

NEBRASKA

Neuropsychiatry Foundation Organized.—The A. E. Bennett Neuro-Psychiatry Foundation, a nonprofit organization to conduct research into the cause, prevention and treatment of neurologic and psychiatric diseases, has been chartered in Nebraska and is functioning at the Bishop Clarkson Memorial Hospital, Omaha. Charter members include Dr. Abram E. Bennett, associate professor of neuropsychiatry, University of Nebraska College of Medicine; Dr. Paul T. Cash, now a major in the Army on duty in the neuropsychiatric service at Camp Carson, Colorado; Foster E. Bennett, Dr. Bennett's son, a student at Dartmouth Medical School, Hanover, N. H.; Fred W. Thomas, Omaha, a vice president of the First National Bank; Carl Falk, Omaha, president of Buffet & Co., and Fred N. Hellner, Omaha, attorney. The organization is the outgrowth of activities of the Fever Therapy Research Department of the University of Nebraska College of Medicine, conducted the past ten years at the hospital under the direction of Dr. Bennett. Besides research, the foundation will train residents or fellows selected by its trustees and finance specified students in graduate work in neuropsychiatry. The facilities at Clarkson, where a whole floor is given over to the neuropsychiatric division, will be used. A private fund of $25,000 will be taken over by the foundation. Members of the advisory board will be Charles F. Kettering, D.Sc., director of research for General Motors Corporation; Dr. Ladislas J. Meduna, associate professor of psychiatry, University of Illinois College of Medicine, and Dr. Hans H. Reese, professor of neuropsychiatry, University of Wisconsin Medical School, Madison. Besides Dr. Bennett, director, the staff now includes Dr. Cornelia B. Wilbur, woman associate, and Dr. R. de la Fuente, graduate of the University of Mexico, and nurses.

NEW YORK

Charles Carpenter Goes to Philippines.—Dr. Charles M. Carpenter, associate professor of bacteriology and public health, University of Rochester School of Medicine and Dentistry, Rochester, has been sent to the Philippine Islands on a special medical mission by the Office of Scientific Research and Development. In cooperation with the medical corps of the Army, Dr. Carpenter will make an investigation of venereal diseases, on which he is a special consultant for the U. S. Public Health Service.

Cancer Teaching Evening.—On October 9 a "cancer teaching evening" will be held at the Rochester Academy of Medicine under the auspices of the Medical Society of the County of Monroe, the academy of medicine, the Seventh District Branch of the state medical society, the University of Rochester School of Medicine and Dentistry, the Tumor Clinic Association of the State of New York, the state medical society and the division of cancer control of the state department of health. The speakers will be Drs. John H. Garlock, New York, on "Carcinoma of the Colon" and John J. Morton Jr., Rochester, "Progress in Cancer Research."

Personal.—Dr. Nelson G. Russell, Buffalo, was honored with a specially called meeting of the city's advisory health board in recognition of his fiftieth anniversary of graduation from medical school. Dr. Russell is chairman of the advisory health board (THE JOURNAL, April 7, p. 934).——Homer L. Sampson, D.Sc., director of the x-ray laboratory at Trudeau Sanatorium, Trudeau, died in the Physicians Hospital, Plattsburg, May 16.—John M. McKibbin, Ph.D., instructor in nutrition, department of biochemistry, Harvard Medical School, Boston, and the School of Public Health, has been appointed assistant professor of physiologic chemistry at Syracuse University College of Medicine, Syracuse.

State Buys Sanatorium for Veterans.—New York State has agreed to purchase the $3,600,000 Metropolitan Life Insurance Sanatorium at Mount McGregor for $350,000 for use as a rest camp for returning New York veterans. At least 500 veterans can be accommodated on the property at one time. The sanatorium consists of seventy-five buildings and 1,500 acres, including a modern 421 acre dairy and poultry farm, and has been maintained since 1913 for Metropolitan employees, especially those with tuberculosis (THE JOURNAL, June 30, p. 679). Under a recently enacted law appropriating $2,825,000 for veterans' assistance (THE JOURNAL, May 12, p. 144) the state was authorized to provide rest camps for returning veterans. It had been planned to have more than one camp, but Governor Dewey, in a statement to the press, said that the Mount McGregor camp is so large and so well equipped that it would obviate the need for additional camps.

New York City

Goldwater Fellows Named.—Dr. I. Norwich, assistant superintendent, Johannesburg Hospital, Johannesburg, South Africa, will fill one of the first S. S. Goldwater fellowships in hospital administration at Mount Sinai Hospital, according to the *Modern Hospital*. The fellowship permits one year of study and observation at Mount Sinai (THE JOURNAL, March 20, 1943, p. 960). Dr. Norwich, who is to arrive in the fall, is a native of Johannesburg and has done graduate medical study in England. Another fellowship has been granted to Marguerite M. Ducker, research assistant in the program in hospital administration at Northwestern University, Chicago. On completion of the fellowship, Miss Ducker is expected to return to the teaching staff in hospital administration at Northwestern.

Study of Alcoholic Addicts.—The New York Academy of Medicine, through one of its subcommittees, is carrying on a survey on the care and treatment of alcoholic addicts. Questionnaires have been sent to physicians in the city and to every hospital, sanatorium and other type of health facility treating inpatients. The physicians were asked whether they treat alcoholic addicts, whether they do so at special hours, what institutional facilities and treatment they use, what auxiliary organizations they use and what in their judgment is the best way to deal with the problem of the alcoholic addict. The hospitals were asked whether they treat alcoholic addicts for complications of diseases, sobering up or for the addiction, how many patients are treated, in what proportion in the acute cases are requests made for treatment for addiction, what treatment is used and whether follow-up services are provided. Results of the questionnaires will be compiled in a report which is expected to be available late in the fall.

OHIO

The Stone Memorials.—According to the *Ohio State Medical Journal* $25,000 has been presented to the Ohio State University College of Medicine by Franz T. Stone, Columbus, in honor of the ninetieth birthday of his father, Julius T. Stone, former member and chairman emeritus of the university's board of trustees. One gift of $20,000 will create the Julius F. Stone Fund for Medical Research, the income to be used particularly for research in the field of physical medicine. The second gift, $5,000, creates the Julius F. Stone Medical Fellowship for research in the division of physical medicine. The first recipient of the fellowship is Dr. William G. Myers, a research associate in the department of bacteriology.

Health Legislation.—A bill has been enacted, effective October 12, authorizing the Ohio Department of Health to devise a suitable program for establishing a blood bank for civilian use. Another bill, effective September 10, provides for about $1,000,000 to improve the state program for control and elimination of Bang's disease in cattle. Newly enacted legislation, effective October 11, changes the name of the division of mental diseases to the division of mental hygiene. An appropriation of $5,000,000 is allotted under House Bill 477 for

improvements in and expansion of the facilities of the colleges of medicine and dentistry at Ohio State University, Columbus, and for the construction of a new hospital for clinic teaching and research.

Gifts to Western Reserve.—The Beaumont Foundation has given $220,000 to Western Reserve University. One hundred thousand has been designated for application toward the cost of a new building to be constructed by the School of Applied Social Sciences, which will ultimately cost about $500,000. One hundred thousand will be devoted toward research in the department of pathology in the medical school and $20,000 will be applied to help finance a project to be undertaken jointly by Western Reserve University and the Cleveland Hearing and Speech Center. A portion will be used for completing and remodeling the new headquarters of the center (THE JOURNAL, June 9, p. 453) and the remainder for research and training of teachers in speech and hearing work. Both gifts were made in memory of Dudley, deceased son of the late Commodore Louis D. Beaumont, the latter having been in earlier years a resident of Cleveland and one of the founders of the May Company. The gift to the university was made through Nathan L. Dauby, Morton J. May and Nathan Loeser, trustees of the Beaumont Foundation.

OKLAHOMA

Progress of Public Relations Program.—The Oklahoma State Medical Association has organized a speaker's bureau consisting of more than 200 members of the medical profession as a part of its recently developed public relations program (THE JOURNAL, July 14, p. 819). Sixty-two laymen, including the governor, the president of the state university and the president of the Oklahoma Agricultural & Mechanical College, have agreed to participate. The general educational program includes:

Public education through the press, radio, motion pictures, and a speaker's bureau.

Postgraduate program to the doctors of the state, refresher courses from the state medical school, residencies and cooperation with the state medical school in added facilities, including research facilities, for returning service men and civilian doctors.

Postwar planning for the placement of doctors now in the armed services.

Intimate contact between the state association and county medical societies.

The program was initiated by a series of meetings in eight councilor districts, the remaining two districts to hold meetings in September.

PENNSYLVANIA

Ninety-Nine Years of Age.—Dr. Frank F. Frantz, Lancaster, observed his ninety-ninth birthday July 19. He is said to be the oldest living graduate of Jefferson Medical College of Philadelphia, receiving his degree in 1869.

Philadelphia

University News.—Under the will of the late Dr. Julius D. Love, Temple University School of Medicine, ultimately will receive one half of his $70,000 estate. Until his death, July 4, Dr. Love had been practicing in Philadelphia for more than fifty-two years.

Personal.—Sir Alexander Fleming has been granted honorary membership in the Philadelphia College of Pharmacy and Science.——Dr. John Hart Toland has been appointed special assistant in the division of medical services of the board of education.——Dr. and Mrs. Charles Price Mercer recently celebrated their fiftieth wedding anniversary.

Memorial to Physician.—A gift of $500 was recently presented as a memorial by the faculty and friends of Dr. Eleanor H. Balph to the Woman's Medical College of Pennsylvania. Dr. Balph was assistant professor of gynecology at the college at the time of her death in May. Dr. Mary M. Spears gave a similar gift in memory of Lieut. William McIndoe Spears Jr., Inf., Army of the United States.

RHODE ISLAND

Society Observes Fiftieth Anniversary.—The Pawtucket Medical Association stemmed from a Medical Science Club organized in Pawtucket in 1894, according to a review of the society's development presented by Dr. William N. Kalcounos, president of the society, as a feature of the society's fiftieth anniversary celebration on June 6. Dr. Charles F. Sweet is the only surviving member of the association, which held its first meeting and election of officers in March 1895. Dr. James L. Wheaton, who joined the association in 1895, was presented with a scroll at the celebration. A similar honor was to be made to Dr. Sweet, who was unable to attend.

TEXAS

Crippled Children Services Transferred to Health Department.—The transfer of the responsibility for administration of the Texas program of services to crippled children from the state department of education to the state department of health was recently authorized.

Changes at Southwestern Medical College.—Dr. Arthur Grollman, professor of experimental medicine, Southwestern Medical College, Dallas, has been named professor of medicine and chairman of the department of experimental medicine. Simon Edward Sulkin, Ph.D., associate professor of bacteriology and immunology, has been named professor and acting chairman of the department. Dr. George T. Caldwell, professor of pathology, has been granted a year's leave of absence.

Hermann Professional Building.—A fourteen story building for offices of doctors and dentists to cost $1,500,000 is being planned for a site adjacent to Hermann Hospital, Houston, newspapers report. The structure will be connected with Hermann Hospital by a tunnel and will be known as the Hermann Professional Building. Present plans call for a penthouse on the fourteenth floor, which will be available for a doctors' club. Tentative reservations for more than 70 per cent of the building space have already been made, it was stated. Another unit for Hermann Hospital is also planned. It will be located on a site between the proposed professional building and the present Hermann Hospital.

Judson L. Taylor Foundation.—The incorporation of the Judson L. Taylor Foundation has been announced. The group, which will assist young surgeons to obtain advanced training and provide lectures by eminent surgeons, honors Dr. Taylor, who died Nov. 28, 1944 of coronary occlusion while serving as a commander in the medical corps of the U. S. Navy. Dr. Taylor had served as president of the Harris County Medical Society and of the State Medical Association of Texas. He had also been a founder member of the American Board of Surgery. Friends who wish to contribute to the memorial to Dr. Taylor may address the Judson L. Taylor Foundation, 229 Medical Arts Building, Houston 2.

WISCONSIN

Cancer Detection Center.—The Medical Society of Milwaukee County some four months ago opened a cancer Detection Center. Space was provided in the student health center annex to the Marquette University School of Medicine, but the project has met with such good response that permanent offices are now being considered in connection with the executive headquarters of the medical society, with a full time medical secretary to answer inquiries and handle case records and follow-ups. Of the 798 persons seen during the first three months of operation, 41 received definite diagnosis of cancer; 18 of these had not been diagnosed previously. In addition to the 41, 74 persons with suspected cancer were seen and 86 gastrointestinal x-rays were recommended.

License Law Now Includes Suspension Clause.—The governor recently signed a law providing that the authority having the power to revoke a physician's license shall also have the power to order its suspension for a period not to exceed two years. The measure was suggested by the state board of medical examiners, and its introduction was authorized by the committee on public policy of the Wisconsin State Medical Society. The old law stipulated that the state board of medical examiners shall revoke the license of a physician convicted of a crime in the course of his professional conduct, and, by action brought for the purpose, a license may be revoked by a circuit court. Under the law many actions were deferred or delayed because law enforcement agencies felt the penalty of revocation was too severe although, in most cases, it was believed that some penalty should be provided.

Faculty Changes at Marquette.—Dr. William A. Douglas Anderson, associate professor of pathology, St. Louis University School of Medicine, St. Louis, since 1940, has been appointed professor of pathology and bacteriology and director of the department at Marquette University School of Medicine, Milwaukee, effective about October 1. Dr. Anderson, who graduated at the University of Toronto Faculty of Medicine in 1934, will also be pathologist at St. Mary's Hospital, Milwaukee. Dr. Samuel B. Pessin, Madison, who graduated at Marquette in 1929, has been appointed associate professor of pathology and bacteriology, also effective about October 1. Michael Laskowski, Ph.D., associate professor of physiologic chemistry at the University of Arkansas School of Medicine, Little Rock, has been appointed associate professor of biochemistry at Marquette University. He succeeds Thomas W. Ray, Ph.D., who retired because of ill health.

GENERAL

Student Health Activities.—New student health service buildings are being planned for the University of Alabama, University; University of Colorado, Boulder; Connecticut College, New London; University of Delaware, Newark, and the University of British Columbia.

Directory of Medical Women.—The first directory of medical women of the United States and its possessions is announced by the *Medical Woman's Journal.* The directory carries about 7,000 names of women physicians listed in alphabetical and geographic divisions.

Porter Fellowship Stipend Increased.—The Porter Fellowship, awarded by the American Physiological Society, which has been carrying an annual stipend of $1,200 given by Dr. William T. Porter of the Harvard Apparatus Company, Boston, has been increased by Dr. Porter to $2,400 annually. The fellowship, which has not been given since 1941, will be resumed in 1946.

Committee to Survey Health Problems in France.—A three member American Red Cross delegation has been named to survey child health problems in France at the invitation of the French government. Members of the committee include Louis I. Dublin, Ph.D., vice president, Metropolitan Life Insurance Company, New York; Dr. Leona V. Baumgartner, pediatrician on leave from the New York City Department of Health, and Mrs. Ida K. Fivian, instructor in foreign languages at the Bradford Junior College, Bradford, Mass.

Theobald Smith Gold Medal Awarded.—The American Academy of Tropical Medicine has announced that the Theobald Smith Gold Medal will be awarded to Dr. Charles M. Wenyon, protozoologist and retired director of the Wellcome Foundation Research Laboratories of London. *Tropical Medicine News* reports that because Dr. Wenyon's health is not in sufficiently good condition for him to make a journey to the United States to receive the award, arrangements will be effected for a presentation in London through the U. S. Embassy.

Journal of Gerontology.—The Gerontological Society, an outgrowth of the American Division of the Club for Research on Ageing, founded in 1939, plans to establish the *Journal of Gerontology,* to be issued quarterly beginning during the first quarter of 1946. According to *Science,* the committee on publications consists of Dr. Roy G. Hoskins, Harvard Medical School, Boston, chairman; Lawrence K. Frank, New York; Dr. William de B. MacNider, University of North Carolina School of Medicine, Chapel Hill, and Dr. Edward J. Stieglitz, Washington, D. C. The editor-in-chief is Dr. Robert A. Moore, Washington University School of Medicine, St. Louis.

Narcotic Violations.—The U. S. Bureau of Narcotics announces the following actions:

Dr. Addison G. Moore, Indianapolis, was convicted in the U. S. District Court at Indianapolis for violation of the federal narcotic law and on July 21 was sentenced to a prison term of one year and one day.

Dr. John C. Bigham, Batesville, Ind., pleaded guilty in the U. S. District Court at Indianapolis to violation of the federal narcotic law and on June 30 was sentenced to pay a fine of $250.

Dr. James W. Benham, Columbus, Ind., pleaded guilty in the U. S. District Court at Indianapolis to violation of the federal narcotic law and on June 30 was sentenced to pay a fine of $300.

Dr. Alma Alphonso Thorum, Spring City, Pa., was convicted in the U. S. District Court at Philadelphia on July 16 of a narcotic violation and was sentenced to serve a prison term of one year and one day.

Dr. Henry M. Bankhead, Fulton, Mo., pleaded guilty in the U. S. District Court at St. Louis to a violation of the federal narcotic law; sentence was suspended and he was placed on probation for five years, one of the provisions of which was that he enter the U. S. Public Health Service Hospital, Lexington, Ky., and remain there until discharged.

Dr. Raymond O. Cheney, Live Oak, Fla., was convicted in the Dade County, Fla., Court of Criminal Record for violation of the Florida Uniform Narcotic Drug Act; on June 26 imposition of sentence was deferred from day to day and term to term until the further order of the court.

March of Dimes Totals Almost Seventeen Million.—A total of $16,589,874 was contributed to the 1945 March of Dimes for the National Foundation for Infantile Paralysis, as against $10,973,491 for 1944. Of the total amount of funds raised, 50 per cent is allotted to national headquarters of the foundation to finance research into the cure and prevention of infantile paralysis and a broad educational program which includes scholarships and fellowships in orthopedic nursing, physical therapy, orthopedic surgery, virology and health education, as well as to maintain an emergency epidemic fund to aid county chapters in areas hard hit by outbreaks of the disease. The other half of the March of Dimes funds is retained by county chapters of the National Foundation to carry on year round services to infantile paralysis victims in the 3,070 counties of the United States. George H. La Porte, who joined the foundation in 1941 as director of fund raising publications and public displays and who in 1943 was named director of the Greater New York fund raising division, has been named director of public relations for the foundation. The first Roosevelt memorial two cent stamp was sold August 24 to Basil O'Connor, president of the foundation, at a special ceremony at Warm Springs, Ga. During the ceremony copies of the stamp were presented to each of the patients at the foundation. The stamp is rectangular, bearing a picture of the "Little White House" on the right and an oval of President Roosevelt on the left.

CANADA

Minister of Health Named Professor.—Dr. Reginald P. Vivian, Port Hope, Ont., minister of health of Ontario, has been appointed to the chair of hygiene and social medicine of McGill University Faculty of Medicine, Montreal, Que., and will take over his activities in September.

The Louis Gross Memorial Lecture.—The eighth annual Louis Gross Memorial Lecture will be delivered at the Jewish General Hospital, Montreal, October 17, by Dr. Paul Dudley White, Boston. His subject will be "The Heart in Hypertension Since the Days of Richard Bright."

The Lamont Memorial Prize.—In memory of his father Dr. Joseph Laurie Lamont, assistant chief medical officer, department of veterans' affairs, Winnipeg, has given $3,000 to the University of Manitoba, the proceeds of which are to be used to provide the Dr. T. J. Lamont Memorial Prize. The new award will be offered every alternate year for an essay or report on original work or investigation on maternal and neonatal welfare. Competition will be open to graduates in medicine of the University of Manitoba up to the fifth medical year, according to the *Canadian Medical Association Journal.*

CORRECTION

Eradication of Yellow Fever.—The Washington Letter in THE JOURNAL, August 18, contained a statement attributed to Dr. Fabio Carmeiro de Mendonca which indicated that UNRRA will shortly inaugurate a world campaign for the eradication of yellow fever and that the disease is quite prevalent in the islands of the Pacific. Yellow fever is not and has not been prevalent in the islands of the Pacific. It is understood that Dr. Mendonca came to this country as a quarantine expert to discuss the extent of the endemic yellow fever area in Brazil. So far as is known, UNRRA does not intend to inaugurate a worldwide campaign to eradicate yellow fever.

Government Services

Two Man Committee to Survey Navy Hospitals

Dr. Basil C. MacLean, professor of hospital administration, University of Rochester School of Medicine and Dentistry, and director of Strong Memorial Hospital, Rochester, N. Y., and William M. Stevenson, New York, who for two years has been director of Red Cross activities in England, Africa and Italy, have been named to a two man committee to survey navy hospital facilities in the country.

Class for Laboratory Technicians

On October 1 the first class for state laboratory technicians on tropical diseases will be opened as part of a program recommended during the November 1944 meeting of the American Society of Tropical Medicine. When petitioned, Dr. Thomas Parran, Surgeon General, U. S. Public Health Service, agreed to sponsor the program of organizing teaching teams, to disseminate material on tropical diseases and, in addition, to form a library of teaching films to be lent to medical societies and other appropriate organizations. Dr. Louis L. Williams Jr., medical director, U. S. Public Health Service, was assigned to formulate plans. The program has recently been transferred to the Office of Malaria Control in War Areas (of the States Relations Division) in Atlanta with Surgeon William S. Boyd, U. S. Public Health Service Reserve, in charge. The Atlanta unit will set up expanded laboratory facilities to offer intensive training in the laboratory diagnosis of tropical diseases, to serve as a diagnostic center for examination of specimens referred by state departments of health and for examinations of diagnostic materials obtained for survey purposes and to make available to technicians in state and local health department laboratories diagnostic and reference materials.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Aug. 11, 1945.

The Shortage of Doctors and the Coming Winter

Considerable concern is felt in the medical profession about doctors' work in the coming winter, which will have to be performed by a profession depleted by the call of the fighting services. The government has refused to make any promises as to demobilization until the war in the Far East is definitely over. Also the occupation of Germany will require the maintenance of a large army. We have been warned to expect a hard winter with a shortage of coal. People are coming back to their old homes no matter in what condition they have been left by German bombing. Overcrowding is inevitable, for many houses have been completely destroyed and there is great shortage of labor in the building trade. Young married people just starting are unable to obtain homes and have to crowd into the homes of relatives. Psychologic upsets and troubles are bound to arise when some men return to their wives and families after years of absence in the forces. The civilian doctor has had a hard time during the war, but it is felt that his hardest time may be in front of him. Before the war the average number of patients per doctor was 1,800; now it is something like 3,500. The British Medical Association has asked for the release from the forces of at least 5,000 doctors before the winter sets in. One London doctor has said "Last week I was the only doctor in my district for well over 10,000 patients, owing to one of my colleagues being ill and another away on holiday."

Full Time Thoracic Surgeons to Be Appointed by the London County Council

The London County Council proposes to appoint for its hospitals two full time thoracic surgeons, of whom the senior will be known as the chief thoracic surgeon. This position has arisen because the comparatively few surgeons available who are competent to undertake this branch of surgery look with disfavor on the sessional rates of remuneration offered by the council: $15 a session in hospitals within the London area and $30 in hospitals and sanatoriums in outer London. During a recent year the total expenditure on fees to five part time thoracic surgeons was $2,900 for 532 sessions. A salary scale substantially higher than that paid by the council to full time surgeon specialists, $6,250 rising by increments of $250 to $7,500 a year, is considered necessary to attract a thoracic surgeon of adequate experience to the post of chief thoracic surgeon. For him, therefore, a salary of $10,000 rising by annual increments of $500 to $12,500 is proposed. The scale for the other thoracic surgeon will be the same as for the surgeon specialists.

International Congress of Obstetrics and Gynecology to Mark the Bicentenary of the Rotunda Hospital

The Rotunda Hospital, Dublin, was founded in 1745 by a physician, Bartholomew Mosse, and is the oldest maternity hospital in the British Isles. Its fame as a teaching center is widespread, and students come to it from all over the world. Its bicentenary falls this year, but, in consequence of the disturbance produced by the war, celebration is deferred until the second week of July 1947, when an International Congress of Obstetrics and Gynecology will be held in Dublin, primarily under the auspices of the Rotunda Hospital, but with the cooperation of the other two Dublin maternity hospitals. The principal subjects contemplated for discussion are eclampsia, sepsis, obstetric shock, fetal mortality and the modern approach to the problem of sterility.

PALESTINE

(From Our Regular Correspondent)

JERUSALEM, June 1, 1945.

An Epidemic of Eosinophilic Erythredema, Possibly Early Filariasis

In a lecture held at the Jewish Medical Association in Tel-Aviv on February 21 A. Klopstock and H. Steinitz reported their observations and studies on a syndrome previously unknown in Palestine. Steinitz reported as the clinical features cutaneous manifestations in the form of swellings and blood changes consisting of leukocytosis with eosinophilia.

The cutaneous swellings are red and hot, similar to erysipelas, occasionally also to urticaria or erythema nodosum. They are of a transient nature persisting, however, three to five days and more and migrating over wide areas of the body. The swelling may be small but may also spread over an entire extremity. Localization on the mucous membranes, lymphangitis or enlargement of nodes is rare. The characteristic migration of the swellings may continue over weeks and months, with normal intervals of a few weeks, followed by a recurrence. In some instances the same region was several times attacked.

The swelling is accompanied by severe itching and occasionally pain.

As regards blood changes, there is frequently leukocytosis, as a rule between 12,000 and 15,000, but counts up to 30,000 have been recorded. The number of eosinophils is almost invariably increased, ranging between 15 and 35 per cent but reaching values of over 50 per cent with considerable variations in one and the same case. Numerous eosinophils have also been found in sternal and tissue puncture. The red blood cell count is normal, the blood sedimentation rate normal or slightly accelerated. Examinations of the urine and the feces are normal. Other findings, including x-ray examinations of the chest, reveal nothing out of the ordinary. The temperature is normal or slightly increased (seldom short attacks of fever when swelling starts); nevertheless the majority of patients complain of general discomfort and of inability to attend to their work.

There may be prodromes, as "rheumatic pains" or general malaise. Although the disease is not apparently of a serious nature, general discomfort as well as long standing and special localization of the swellings may have a bad influence on the general condition.

In the discussion a number of physicians were able to confirm these observations, especially Leffkowitz and Sukiennik, whose papers, as well as those of Klopstock and Steinitz, were published in *Harefuah,* March 15. Larger numbers of cases have been noted since November 1944, but sporadic cases certainly have occurred in the past few years. After the first cases had made their appearance in Tel-Aviv and its neighborhood others were reported from Jerusalem and a few from rural settlements. Recently Lyon and Kleinhaus (*Acta med. orient.,* May) gave an account of their observations in Jerusalem, among them 2 cases with transitory pulmonary infiltrations (Loeffler's syndrome). The total number of cases in Palestine may amount to about 200. Children are only exceptionally attacked.

According to Klopstock, who studied the epidemiologic aspects, it is certain that we are dealing with an allergic phenomenon and that the clinical picture is strikingly similar to "Calabar swelling," the allergic phase of filariasis. It should be borne in mind that war conditions have increased the possibilities of infection with filariae in this country, which until now had been free from this disease. But so far no microfilariae could be found in spite of repeated examinations of the blood and of tissue puncture; biopsies did not reveal parasites either. Skin tests could not so far be carried out, but it is to be hoped that filaria antigen will be available in this country in the near future; only then will it be possible to decide whether or not

this disease constitutes an early stage of a filaria infection. At present the etiology remains obscure. For practical purposes Klopstock and Steinitz suggest the name of eosinophilic erythredema for this disease.

BUENOS AIRES

(From Our Regular Correspondent)

July 16, 1945.

Effect of Alloxan on Glycemia in Dogs

Dr. B. A. Houssay recently lectured before the Argentine Society of Biology. He reported results of experiments which were carried on with the collaboration of Drs. O. Orias and J. C. Sara. The intravenous injection of alloxan in a dose of 100 mg. for each kilogram of body weight produces early glycemia, which equals that which follows the removal of the adrenals or the section of the great and lesser splanchnic nerves. Glycemia does not increase, however, if the animals are deprived of the liver. Early hyperglycemia is followed by lowered glycemia; which lasts for several hours. It also occurs in dogs recently deprived of the pancreas, but it does not occur in diabetic dogs. Terminal hyperglycemia occurs. It shows degeneration of the islands of Langerhans. Early hyperglycemia is higher than that which follows total renewal of the pancreas. Twenty-four hours after administration of the injection of alloxan the pancreas of 5 of every 6 dogs does not secrete insulin. The adrenal incapacity persists even in the period of transient hypoglycemia. The liver seems to play the main role in the changes of glycemia, namely an early phase of hyperglycemia, an intermediate phase of hypoglycemia and a final phase of hyperglycemia.

Potassium Thiocyanate in Arterial Hypertension

In a paper read before the Ateneo del Hospital Militar Central of Buenos Aires Drs. Ernesto A. Rottjer and Alfredo C. Carreras reported good results from the administration of sodium thiocyanate in 9 cases of essential hypertension and 1 case of malignant hypertension due to diffuse postglomerulonephritis. There was a remission of symptoms in all cases. Arterial tension returned to normal in all cases. Toxic symptoms did not appear. The administration of sodium thiocyanate calls for a careful clinical examination of the patient before administering the treatment. In the course of the treatment determinations of the amount of the drug in the blood should be made twice a week. Repeated clinical examinations of the patient and determinations of the arterial blood pressure should be performed.

Dental Care of Children

Dental care for children of school age and adolescence is obligatory in Argentina. Children on entering school have a dental examination, the results of which are recorded on the proper card and the latter is kept on file. The examinations are repeated periodically. The parents are notified when the children require dental care, which can be given by the family dentist or free in the dental national centers. Parents who break the law are fined 20 to 50 Argentine pesos ($5 to $12). Teachers may be penalized with a fine of 100 Argentine pesos ($25). Repeated infraction is punished with temporary closure of the school if private or with discharge of the teacher if the school is operated by the government.

Measures to Increase Birth Rate

The Minister of Internal Affairs recently appointed a committee with Dr. Manuel A. Viera as president to study and remedy the causes of the lowering of the birth rate and to stimulate the creation of large families in the country. Several problems concerned with the welfare of children will be studied. Special care is to be given to improve the economic conditions of parents of large families in order to provide the children with the proper housing, food, hygiene and cultural conditions.

Congress of Internal Medicine

The second reunion of the Society of Internal Medicine of the Asociación Médica Argentina was held during the last week of October 1944. Dr. Egidio S. Mazzei was the president. The official topic was chemotherapy (sulfonamides and penicillin) in infections in internal medicine. Dr. Mario Soto spoke on pharmacology of sulfonamides. Drs. Mariano R. Castex and Eduardo L. Capdehourat spoke on sulfonamide therapy in chronic infections of the respiratory tract. Dr. Egidio S. Mazzei spoke on sulfonamide therapy in endocarditis lenta. Drs. Paul D. White, Marion W. Mathews and Elwyn Evans reported the results of sulfonamide therapy in 85 cases of subacute bacterial endocarditis in the Massachusetts General Hospital during the years 1939 to 1944. Drs. Julio Palacio, Francisco Arrillaga, Nicolás Romano, Rodolfo A. Eyherabide, Victorio Monteverde, Diego Taylor Gorostiaga, Alberto Maggi, Carlos Alberto Videla and Guido Costa Bertani discussed the therapeutic uses of sulfonamide. Dr. Felipe Morán Miranda spoke on renal complications of sulfonamide therapy. Dr. B. Varela Fuentes of Montevideo spoke on sulfonamide therapy in biliary infections.

Control of Publicity on Cancer

A law was recently passed according to which all reports of the use of drugs or treatments for curing cancer should be made to the National Department of Public Health before being made public. The law was based on the harm which may result to the laymen in neglecting cancer for a useless treatment. The authorities of public health all through the country have given radio lectures discussing the scientific treatment of cancer and advising people to stay away from charlatans.

Professional Theses

The council of the Faculty of Medicine of Buenos Aires recently resolved that physicians graduated from the medical school can practice either with a certificate in which it is stated that they have successfully completed the studies of the curriculum and done the necessary duties, or with an M.D. diploma. The diploma is given only to students who successfully complete the studies of the curriculum and who present a "thesis of doctor in medicine" with results of scientific research as carried on during the studies in the medical school.

New Department of Public Health

The Section of Rheumatology, Cardiovascular Diseases and Neoplasms, a branch of the Division of Social Diseases, which is a department of the National Department of Public Health, was recently created. The Division of Social Diseases includes sections on cancer, leprology, venerology, mental diseases and toxicomania, rehabilitation of invalids and rheumatology, and cardiovascular diseases and neoplasms.

Marriages

DAVID M. SWITZER JR., North Little Rock, Ark., to Miss Mary Dorothy Walker of Meridian, Miss., June 3.

ALLEN MANSFIELD COLLINGSWORTH, Atlanta, to Mrs. Janice Fuquay Byers of Montgomery, Ala., July 14.

JOSEPH BRISBANE to Miss Marguerite Krock, both of New York, in Greenwich, Conn., March 10.

WILLIAM A. BUTCHER, Adrian, Mo., to Miss Elaine Carolyn Bottomley of Philadelphia, May 12.

LINDSAY KERR BISHOP, Nashville, Tenn., to Miss Marianne Coleman of Maryville, July 17.

DAVID MENDELL, Houston, Texas, to Miss Miriam Wydra of Washington, D. C., June 27.

MARK G. RISSER, Emerald, Pa., to Miss Mary Alice Christman of Allentown, June 16,

Deaths

Lewis Alexander Golden ✠ New Orleans; University of Michigan Medical School, Ann Arbor, 1929; born in Riga, Baltic State, Dec. 31, 1903; assistant professor of neuropsychiatry at the Tulane University of Louisiana School of Medicine; served as teaching assistant in medicine, research fellow in medicine and instructor in medicine at the Tufts College Medical School in Boston; served a rotating internship at the Hillman Hospital in Birmingham, Ala., and a residency in medicine at the Boston Dispensary, where he had been assistant physician in the medical clinic and assistant physician in the nervous and mental department; formerly assistant physician at the Diagnostic Hospital, New England Medical Center; for six months clinical clerk at the National Hospital for Nervous Diseases in London, England; specialist certified by the American Board of Psychiatry and Neurology, Inc.; member of the state board of institutions; member of the Southern Psychiatric Association and the American Psychiatric Association; served as secretary-treasurer of the New Orleans Society of Neurology and Psychiatry; at one time graduate assistant (teaching), neurologic department, Massachusetts General Hospital and Harvard Medical School in Boston; on the staffs of the Ochsner Clinic, De Paul Sanitarium, Charity Hospital and the Touro Infirmary, where he died June 22, aged 41, of renal lithiasis and uremia.

George Argale Harrop ✠ Princeton, N. J.; Johns Hopkins University School of Medicine, Baltimore, 1916; born in Peru, Ill., in 1890; vice president of E. R. Squibb & Sons and director of the Squibb Institute for Medical Research in New Brunswick; at one time an intern and assistant resident physician at Johns Hopkins Hospital; for a time served on the faculty of Columbia University and the Peiping Union Medical College in China; from 1925 to 1938 associate professor of medicine at his alma mater, where he had been in charge of the chemical laboratory and work on diseases of metabolism and endocrinology; specialist certified by the American Board of Internal Medicine; fellow of the American Scandinavian Foundation and the American College of Physicians; member of the Association of American Physicians, American Society for Clinical Investigation, American Society of Biological Chemists, Society for Experimental Biology and Medicine, Société Biologique of Paris, New York Academy of Medicine and the American Clinical and Climatological Association; author of "Management of Diabetes" 1925 and "Diet in Disease" 1930; died in the Stephen V. Harkness Pavilion for Private Patients, Medical Center, New York, August 4, aged 54.

Thomas J. Williams ✠ Chicago; State University of Iowa College of Medicine, Iowa City, 1908; born in Colwyn Bay, Wales, May 8, 1882; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; licentiate and fellow of the Royal College of Surgeons of Edinburgh, Scotland, in 1914; at one time health officer of Hiteman, Iowa; formerly professor of ophthalmology at the Illinois Post-Graduate Medical School; at the beginning of World War I was with the British Hospital Service, becoming a captain in the medical corps of the U. S. Army when the United States entered the war; on the consulting staff in eye, ear, nose and throat of the Illinois Masonic Hospital; attending surgeon to St. Francis and Evanston hospitals, both in Evanston, Ill.; died at his home in Evanston, Ill., August 10, aged 63, of coronary thrombosis.

John Cameron McCluer ✠ Alexandria, Va.; University of Virginia Department of Medicine, Charlottesville, 1932; interned at the De Paul Hospital in St. Louis and the Camden-Clark Memorial Hospital in Parkersburg, W. Va.; past president of the Alexandria Medical Society; member and director of the city tuberculosis association, serving as a member of its board of trustees and medical advisory staff; for five years a member and for two years president of the city board of health; member and past president of the staff of the Alexandria Hospital; on the courtesy staffs of the Doctors Hospital, Emergency Hospital and the Garfield Memorial Hospital, Washington, D. C., where he died June 26, aged 39, of lymphoid pneumonia.

Louise Lockwood Culver, Sandwich, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; died July 14, aged 75, of chronic myocarditis.

Clark Bradshaw Denny ✠ Oakdale, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1901; died in the Mercy Hospital, Pittsburgh, April 27, aged 65, of pneumonia.

Martin Icove Green ✠ San Francisco; College of Physicians and Surgeons of San Francisco, 1921; member of the Pacific Coast Oto-Ophthalmological Society; fellow of the American College of Surgeons; co-founder and chief of staff, Greens' Eye Hospital; died in the Mount Zion Hospital June 30, aged 46, of endothelial sarcoma.

Louis Benjamin Heimer, Philadelphia; University of the South Medical Department, Sewanee, Tenn., 1904; Jefferson Medical College of Philadelphia, 1905; formerly affiliated with the Northwestern General and American Stomach hospitals; died June 22, aged 65, of cerebral embolism.

Lewis George Hildreth, Marlboro, N. H.; Kentucky School of Medicine, Louisville, 1892; member of the American Medical Association; school physician and health officer; died in Keene June 25, aged 77, of arteriosclerosis, diabetes mellitus and uremia.

Wesley J. Irvine, Manawa, Wis.; University of Maryland School of Medicine, Baltimore, 1892; member of the American Medical Association; honorary member of Waupaca County Medical Society; member of assembly, state legislature, from 1905 to 1907; served during World War I; president of the Farmers State Bank of Manawa; died June 6, aged 78, of cerebral thrombosis.

Archibald Charles Kappel ✠ Franklin, La.; Tulane University of Louisiana School of Medicine, New Orleans, 1913; member of the city council; died June 4, aged 56, of heart disease.

Daniel Kessler, Weston, W. Va.; University of Louisville Medical Department, Louisville, Ky., 1891; member of the American Medical Association; honorary member of the West Virginia State Medical Association; one of the founders of Camp Gauley in Webster County; died July 30, aged 81, of heart disease.

Reinoehl Knipe, Norristown, Pa.; Medico-Chirurgical College of Philadelphia, 1898; member of the American Medical Association; served as chief of the state tuberculosis clinic; for many years chief physician for the Montgomery County prison; on the staffs of the Montgomery and Sacred Heart hospitals; died June 21, aged 77, of heart disease.

Frank Xavier Koltes ✠ Medical Director, Captain, U. S. Navy, retired, Milwaukee; Rush Medical College, Chicago, 1903; entered the medical corps of the U. S. Navy as a lieutenant (jg) on May 21, 1907; became a captain on May 11, 1930; retired April 1, 1938 for incapacity resulting from an incident of service; fellow of the American College of Surgeons; died in the U. S. Naval Hospital, San Diego, July 14, 1944, aged 66, of coronary heart disease.

Elmer Lee, New York; Missouri Medical College, St. Louis, 1882; died in the Cincinnati Sanitarium, Cincinnati, June 13, aged 89, of generalized arteriosclerosis and senility.

Joseph Leo, New York; University and Bellevue Hospital Medical College, New York, 1910; died June 28, aged 65, of heart disease.

Fred Irvin Longstreet, Montville, N. J.; Hahnemann Medical College and Hospital of Philadelphia, 1899; died in the All Souls Hospital, Morristown, June 14, aged 69, of peritonitis from ruptured diverticulum of the colon.

Inte Ignaz Lourie, Brooklyn; Long Island College Hospital, Brooklyn, 1904; also a pharmacist; formerly affiliated with the Post-Graduate, Trinity and Israel Zion hospitals; died in the Long Island College Hospital June 21, aged 69, of heart disease.

Albert Emanuel Loyer, New Washington, Ohio; Medical College of Ohio, Cincinnati, 1895; served as surgeon to the Lake Erie and Western Railroad; died June 25, aged 72, of cerebral hemorrhage and hemiplegia.

John Neal Martin ✠ Unionville, Mo.; Chicago College of Medicine and Surgery, 1916; served as county health officer; died June 10, aged 52, of injuries received in an automobile accident.

James Claude McLallen, Cicero, Ill.; Jenner Medical College, Chicago, 1909; died in St. Elizabeth's Hospital, Chicago, June 14, aged 67, of coronary thrombosis.

Walter Guy McLeod ✠ Southern Pines, N. C.; Baylor University College of Medicine, Dallas, Texas, 1921; interned at the Baylor Hospital in Dallas and the St. Francis Hospital in Jersey City, N. J.; died in the Mountain Sanitarium and Hospital, Fletcher, June 23, aged 54, of myocardial insufficiency.

Beriah Alembert Montgomery ✠ Grove City, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1899; served during World War I; major, medical reserve corps, U. S. Army, not on active duty for eighteen years

member of the board of education; served on the staff of the Grove City Hospital, where he died July 21, aged 72, of coronary thrombosis.

Watson Alexander Moore, Cleveland, Mo.; Medico-Chirurgical College of Kansas City, Mo., 1904; member of the American Medical Association; served as president of the board of education and as postmaster of West Line; for many years member of the board of education in Cleveland; died in Kansas City June 14, aged 66, of generalized arteriosclerosis and coronary thrombosis.

Benjamin M. Nicholson, Enfield, N. C.; University College of Medicine, Richmond, 1910; member of the American Medical Association; honorary member of the Medical Society of the State of North Carolina; died in the Rocky Mount Sanitarium, Rocky Mount, June 11, aged 56, of cardiovascular renal disease.

Charles Julius Oppenheim ✠ Forest Hills, N. Y.; Cornell University Medical College, New York, 1923; served on the staffs of the Beekman and Lenox Hill hospitals, New York; died June 24, aged 50, of hypertension and arteriosclerosis.

Ralph V. Overton ✠ Winner, S. D.; Lincoln (Neb.) Medical College of Cotner University, 1902; part owner of the Winner General Hospital; died in Sioux City, Iowa, June 20, aged 65, of coronary thrombosis and hypertensive heart disease.

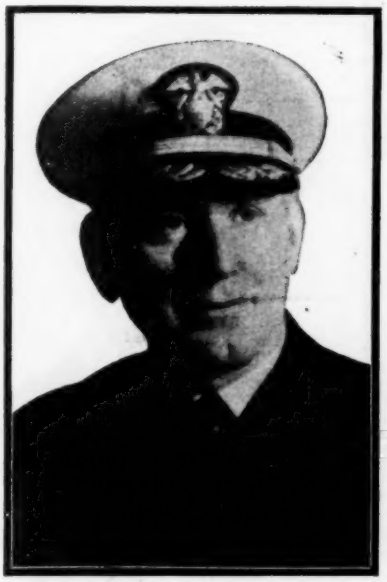
William B. Page, Goshen, Ind.; Hering Medical College, Chicago, 1896; formerly a medical missionary in India; served during World War I; past president of the Elkhart County Medical Society; died June 14, aged 74, of coronary thrombosis.

Charles Walter Patterson, Crowder, Miss.; Mississippi Medical College, Meridian, 1907; died in Grenada June 22, aged 70, of cerebral hemorrhage.

Ira E. Perry ✠ North Manchester, Ind.; Medical College of Indiana, Indianapolis, 1905; served as councilor of the Eleventh District Medical Society; for many years health officer of Wabash County; at one time county coroner; past president of the Wabash County Medical Society; died June 18 at his summer home on Webster Lake, aged 72, of heart disease.

Peter Heije Poppens ✠ Princeton, Ill.; Rush Medical College, Chicago, 1920; past president of the Bureau County Medical Society; on the staff of the Julia Rackley Perry Memorial Hospital; interned at the Presbyterian Hospital in Chicago; died June 8, aged 53, of embolism as the result of an automobile accident.

Frank Edward Potter, Middletown, Conn.; College of Physicians and Surgeons, New York, 1889; member of the American Medical Association; died in East Hampton May 23, aged 90, of coronary thrombosis.



LIEUT. COMDR. CLYDE H. BROWN
(MC), U.S.N.R., 1902-1945

CAPT. DUANE HAROLD CALLISTER
M. C., A. U. S., 1913-1945

LIEUT. JAMES ALBERT GAFFORD JR.
(MC.), U.S.N.R., 1906-1945

Theodore Herbert Page, Peoria, Ill.; Rush Medical College, Chicago, 1897; served overseas during World War I; died in Tucson, Ariz., June 11, aged 70, of carcinoma of the colon.

Henry G. Reemsnyder, Ephrata, Pa.; Jefferson Medical College of Philadelphia, 1881; member of the American Medical Association; at one time member of the board of health; died in St. Joseph's Hospital, Lancaster, May 21, aged 84, of

KILLED IN ACTION

Clyde Hulee Brown ✠ Cullman, Ala.; Vanderbilt University School of Medicine, Nashville, Tenn., 1926; interned at the Knickerbocker Hospital in New York; member of the Medical Society of the State of New York; began active duty as a lieutenant commander in the medical corps of the U. S. Naval Reserve on May 12, 1942; assigned to the Naval Hospital in Newport, R. I.; in command of a Marine Corps Mobile Hospital unit; died in Okinawa April 12, aged 42, of fragment bomb wound of the head.

Duane Harold Callister, Fillmore, Utah; Rush Medical College, Chicago, 1942; interned at the Dr. W. H. Groves Latter-Day Saints Hospital in Salt Lake City; began active duty as a first lieutenant in the medical corps, Army of the United States, on Aug. 24, 1943; later promoted to captain; killed in action in Belgium January 9, aged 31.

James Albert Gafford Jr. ✠ Huntington Park, Calif.; Stanford University School of Medicine, San Francisco, 1931; fellow of the American College of Surgeons; interned at the Los Angeles County General Hospital, where he served a residency and had been junior attending gynecologist; served as instructor in obstetrics and gynecology at the University of Southern California School of Medicine; member of the staff of the Methodist Hospital of Southern California, Los Angeles; began active duty as a lieutenant in the medical corps, U. S. Naval Reserve, on Feb. 15, 1943; assigned to Camp Pendleton in Oceanside; since January 2 junior medical officer on the U. S. S. *Birmingham;* died in the Pacific area May 4, aged 38, of extreme multiple injuries.

hypertensive arteriosclerotic heart disease and chronic glomerular nephritis.

Carl Eugene Richardson ✠ Franklin, Mass.; Tufts College Medical School, Boston, 1907; medical examiner in Norfolk County for twenty-one years; member of the school board; trustee of the Benjamin Franklin Savings Bank; died July 30, aged 61, of coronary thrombosis.

William R. Riley, Everton, Mo.; St. Louis College of Physicians and Surgeons, 1897; chairman of the Dade County Central Democratic Committee; for many years president of the board of education; served on the staffs of the Burge Hospital, Springfield Baptist Hospital and St. John's Hospital, Springfield, where he died May 15, aged 77, of heart disease.

Leroy L. Sawyer, Greatbridge, Va.; University of Maryland School of Medicine, Baltimore, 1890; a director of the Merchants and Planters Bank in Norfolk; died June 13, aged 80, of pneumonia and heart disease.

Albert F. Schwenke, Lancaster, Ohio; Starling Medical College, Columbus, 1889; died June 2, aged 80, of heart disease and arteriosclerosis.

Charles James Search, Brooklyn; University of Wooster Medical Department, Cleveland, 1892; member of the American Medical Association and the American Roentgen Ray Society; at one time instructor in physiology at the Long Island College Hospital; served on the staffs of St. John's Hospital and the House of St. Giles the Cripple; died June 5, aged 81, of arteriosclerosis.

Mark Shrum, Lynn, Mass.; University of Louisville (Ky.) Medical Department, 1894; at one time a member of the board of registration in medicine; died June 30, aged 76, of intestinal obstruction.

Myron Herbert Simmons, Oak Hill, N. Y.; Albany Medical College, 1880; served as president and member of Orange Memorial Hospital Dispensary staff in Orange, N. J.; in 1944 received a gold decoration from the alumni association of Albany Medical College in recognition of his fifty years of meritorious service to humanity; died July 16, aged 87, of congestive heart failure.

Tilden H. Singleton, Bowling Green, Ky.; Hospital College of Medicine, Louisville, 1904; member of the American Medical Association; member of the county board of health; on the staff of the City Hospital; died June 6, aged 68, of coronary thrombosis.

John Yeoman Sinton ✠ Imlaystown, N. J.; Medico-Chirurgical College of Philadelphia, 1908; for many years school physician; secretary of the Upper Freehold Township Board of Health; served on the staff of St. Francis Hospital in Trenton; died May 31, aged 81, of coronary occlusion.

Ernest William Slater, Jewell, Iowa; Northwestern University Medical School, Chicago, 1906; died May 24, aged 72, of acute dilatation of the heart.

Thomas O. Smith, Wilsonville, Ala. (licensed in Alabama in 1907); member of the American Medical Association; member of the school board and city council; died June 17, aged 69, of cerebral hemorrhage.

LIEUT. THEODORE BOYT
(MC), U.S.N.R., 1912-1944

CAPT. ARTHUR JAMES LEONARD
M. C., A. U. S., 1914-1944

LIEUT. WILLIAM ASHBY DAVIS
M. C., A. U. S., 1916-1944

Robert Edward Whitehead ✠ Kempsville, Va.; Medical College of Virginia, Richmond, 1897; served as president of the Princess Anne County Medical Society and as councilor of the Second District of the Medical Society of Virginia; member of the Seaboard Medical Society; member of the county draft board during World Wars I and II; died in a hospital at Norfolk July 2, aged 72, of cerebral hemorrhage.

KILLED IN ACTION

Theodore Boyt, South Amboy, N. J.; Long Island College of Medicine, Brooklyn, 1939; served an internship at the Jersey City Hospital in Jersey City and later became resident physician at the Woman's Hospital in Detroit; commissioned a lieutenant (jg) in the medical corps, U. S. Naval Reserve, on June 5, 1942; promoted to lieutenant on May 1, 1943; following service and special training in this country, assigned to the destroyer U. S. S. *Buck;* participated in the Sicilian invasion and received the European-African-Middle Eastern Area campaign ribbons and the Purple Heart; while on an antisubmarine patrol south of the Isle of Capri the *Buck* was torpedoed and sunk; at first reported missing in action; aged 32; presumptive date of death Oct. 10, 1944.

Arthur James Leonard, Pittsburgh; University of Pittsburgh School of Medicine, 1941; interned at the Allegheny General Hospital; began active duty as a first lieutenant in the medical corps, Army of the United States, on Aug. 1, 1942; promoted to captain; served in the First Division; served through the African and Sicilian campaigns; killed in action in France July 3, 1944, aged 29.

William Ashby Davis, Agricola, Va.; University of Virginia Department of Medicine, Charlottesville, 1942; interned at the Roper Hospital in Charleston, S. C.; began active duty as a first lieutenant in the medical corps, Army of the United States, on July 16, 1943; killed in action in North African area April 20, 1944, aged 27.

Bureau of Investigation

NEW NAMES FOR OLD SWINDLES

Mail-Order Defrauders Are Also Repeaters

Fraud orders issued by the United States Post Office are really effective—so far as the trade styles and names used at the time of the order are concerned. Circumvention therefore requires the use of new trade styles and names—but this fortunately results in the issuance of supplemental orders by the Post Office Department as indicated in the following paragraphs:

More Edward S. Hidden Frauds.—In this department of THE JOURNAL Dec. 20, 1941, page 2188, there appeared under the title "Edward S. Hidden and Some Fakes" a detailed account of fraud orders that had been issued by the Post Office Department against two earlier swindles perpetrated by Hidden. One was a "fat cure" variously known as "Slim-A-Lax" and "Tab Thins." This business he operated under the names Madison Chemical Company, Tab Thins Company, Slim-A-Lax Company, Riverside Chemical Company and C. N. Talcott. The other was an alleged baldness cure called "Nuhair," in the sale of which he did business under his own name and also as C. J. Walton, Nuhair Company and Nu Hair Company. Like some others who were denied the use of the mails by the Post Office Department, Hidden stayed in business simply by dropping his original trade styles and adopting new ones. He appears to have organized the Cooper Distributing Company and the Carolina Chemical Company, both of Charleston, S. C. Under the latter title there were also branches at Pitcairn and Pittsburgh, Pa., Detroit, Quincy, Ill., and Greensboro, N. C. Under these various trade styles Hidden promoted "Nu-Hair" for growing hair, with an accessory "slicking" cream, besides "Lax," a laxative mixture for reducing, and "Muscl-Free," a liniment to be used in connection with certain powders for various forms of rheumatism. Again Hidden was ordered by the Post Office Department to show cause why he should not be debarred from the mails for obtaining money through those channels by means of false and fraudulent pretenses, representations and promises. At the hearing a government chemist testified that Nu-Hair was a hydro-alcoholic liquid containing 10 per cent of mineral oil by volume and 9.5 per cent of isopropyl alcohol, colored pink; that the Lax treatment consisted of some pink tablets composed of laxatives, and some white ones, each apparently containing about ½ grain of thyroid; and that Muscl-Free consisted of a bottle of liniment for external use and some powders to be taken internally. The witness testified that he had found the liniment to contain the ingredients declared on the label, namely, isopropyl alcohol and methyl salicylate, but that his findings as to the composition of the powders (acetylsalicylic acid, sodium salicylate and milk sugar) differed from that declared on the label, which listed caffeine and calcium salicylate in addition. An expert medical witness for the government testified at some length regarding the worthlessness of these "cures," and on Sept. 4, 1944, a fraud order was issued against Edward S. Hidden, the Cooper Distributing Company, Carolina Chemical Company, and the branches of the latter in the various cities mentioned. On the same date another fraud order was issued against the Lax Company, Reducing Specialists; D. Rodrigrez, Weight Consultant, and the Charleston Vitamin Company, under which names Hidden was operating his scheme from Mexico City. By the order Hidden was denied further use of the United States mails. As might be expected, he began to operate from another Mexican city, Nuevo Laredo, under one of the trade styles he had used in the foregoing scheme, Lax Company. A month later—on Oct. 3, 1944—the Post Office Department issued a fraud order also against this name, but it is a sporting proposition that ere long he will be heard from again in Mexico, with the same old stock in trade but a new title and address.

Trans-Continental Products.—This was a follow-up of another mail-order swindle, which originated in Chicago with one Eli Siegel, M.D., and which he promoted under such names as Chicago Medical Institute, Dr. Siegel's Medical Products, Chicago Medical Offices and Globe Surgical Institute. Dr. Siegel holds a diploma from a medical school of questionable standing. In The Journal, Jan. 22, 1938, page 303, appeared a long account of the case in which the Post Office Department in 1937 issued a fraud order against Siegel personally, and his concern "Dr. Siegel Medical Products." As the article stated, he had appealed to sexual neurasthenics by offering certain drugs and appliances that he claimed would make them "full of vim, vigor and vitality" and cause them to "feel thirty years younger." He called his drug combinations "Revivo" and "Control-O" and his appliance the "Great Mechanical Developer," which device the government declared was merely a mechanical masturbator. On Aug. 28, 1940, on application of Dr. Siegel and what appeared to be evidence that he had abandoned his mail-order scheme, the fraud order was revoked to the extent of permitting him to receive mail addressed personally to him. Later, however, another enterprise was launched by Siegel's wife, under the names U. S. M. Products, U. S. M. Products Company, U. S. Medical Products, and U. S. Medical Products Company, Chicago, to sell two nostrums through the mails. These were "Firm-X," to restore "pep" to all men over forty years old, overcome all symptoms of old age and enable users to maintain their youthful vigor, energy and vitality; and "Stop-X," represented to overcome all kidney and bladder weaknesses. When a new Post Office fraud order threatened, Mrs. Siegel attempted to circumvent it by filing an affidavit that the scheme had been discontinued and that the Chicago postmaster was to return to writers any mail addressed to her concern, with the stamped notation "Out of business." Soon afterward, however, the Post Office Department learned that she was again using the mails in a questionable manner, this time using the name Trans-Continental Products, and accordingly the Department directed her to show cause why a fraud order should not be issued against that name. At the hearing of the case it was brought out that Mrs. Siegel was now calling her products "Peps Regular," "Peps Special" and "Peps for Women" or "Pepson" and promoting them for lost sexual power in men and women, sending out literature similar to that used by Dr. Siegel in the earlier enterprise. An expert medical witness for the Post Office Department testified that in view of the composition of the nostrums as reported by a government chemist, they did not fulfil the claims made for them. The business was therefore judged a scheme for obtaining money through the mails by means of false and fraudulent pretenses, representations and promises, and since investigation had shown that the apparently fictitious name John Dreyer had been employed in operating the business, a fraud order was issued Sept. 11, 1944, against John Dreyer, the Trans-Continental Products, and their officers and agents, debarring them from further use of the mails.

Correspondence

GAMMA GLOBULINS

To the Editor:—In a communication (July 7, p. 750) an editorial of THE JOURNAL (June 9, p. 442) was criticized for giving "the impression that only until recently has the origin of the globulins remained uncertain." According to Dr. Hobart A. Reimann, numerous investigators in the last fifty-three years have held the view that globulins originated in the leukocytes.

We wish to point out that the literature referred to by Dr. Reimann (Reimann, H. A.; Medes, G., and Fisher, L.: The Origin of Blood Proteins, *Folia haemat.* **52**:187, 1934) is not concerned with gamma globulins; it deals almost entirely with fibrinogen, which is now generally believed to be formed in the liver. Only two authors are quoted to have suggested that some globulins as well as fibrinogen were possibly produced by leukocytes, while one author believed that all plasma proteins arose from the disintegration of leukocytes and possibly also from the platelets and other cells in contact with the blood. When studying this problem experimentally in rabbits, Reimann and his associates were unable to find "decisive evidence to support the leukocytic origin of blood proteins or that the bone marrow is the chief site of their origin." When examining the cells of experimental pleural exudates they found "that certain substances in the leukocyte extracts were salted-out at various concentrations of Na_2SO_4 which are known to throw down various protein fractions." They admitted that this observation was not sufficient to "identify these substances with certainty," as they failed to give the usual immunologic and clotting reactions. Reimann and his associates came to the conclusion that "thus far, therefore, it is impossible to designate either the liver or other hemopoietic organs, the leukocytes or the erythrocytes as the chief or sole sources of fibrinogen."

Dr. Reimann's communication, therefore, does not reflect on the validity of the various recent editorials of THE JOURNAL on the production of antibodies and other gamma globulins. It seems that our own observations (Ehrich, W. E., and Harris, T. N.: *J. Exper. Med.* **76**:335 [Oct.] 1942. Harris, T. N.; Grimm, E.; Mertens, E., and Ehrich, W. E., *ibid.* **81**:73 (Jan.) 1945) as well as those of White and Dougherty (Dougherty, T. F.; Chase, J. H., and White, A.: *Proc. Soc. Exper. Biol. & Med.* **57**:295 [Nov.] 1944. White, A., and Dougherty, T. F.: *Endocrinology* **36**:207 [March] 1945) and of Edward H. Kass (*Science* **101**:337 [March 30] 1945) are the only ones which indicate that antibodies and other gamma globulins may be formed by the lymphocytes.

WILLIAM E. EHRICH, M.D.
T. N. HARRIS M.D.
Philadelphia.

VESICULOPUSTULAR ECZEMA

To the Editor:—Probably two thirds of the patients seen on dispensary service in the field are suffering from some type of skin disease. It is important to recognize and treat these cases early, for secondary infection occurs readily in the tropics as a result of the humidity and lack of bathing facilities noted among the front line outfits.

During the past two years I have had the opportunity to observe a considerable number of cases of vesiculopustular eczema. There is no conclusive evidence that micro-organisms act as a primary cause, but they frequently aggravate the condition as secondary invaders. The lesions usually present themselves as small maculopapular eruptions, located usually in the axillary regions, the thorax and the anterior and anterolateral abdominal walls. These lesions cause mild pruritus associated with a "burning sensation" when the lesions are found in the axillas. After several days the small macular areas become prominent as larger vesicles filled with a clear fluid. Unless the lesion is treated at this stage the vesicles become pustular in nature.

In the macular stage the treatment is purely symptomatic, calamine lotion being used on the body surfaces and zinc oxide applied to the lesions in the axillas. As soon as the lesions become vesicular the vesicle should be removed and touched with a small amount of Dalibour's solution (copper sulfate, zinc sulfate and gentian violet). The astringent action of the latter quickly forms a thin film over the lesion, and desquamation occurs, usually leaving an area of depigmentation. The pruritus and slight pain caused by the lesion is relieved immediately on first application. No fungi or bacteria were found in the vesicular lesions, and when the latter became pustular, staphylococci and streptococci were the predominant organisms found.

I mention this type of treatment mainly because of the rapidity of cure obtained, and hence there is less chance of overtreatment, which so often occurs in treating diseases of the skin.

PAUL A. NEWTON, Captain, M. C., A. U. S.
Med. Det., 129th Infantry, APO 37,
P. M., San Francisco, California.

PNEUMONIA AND RESPIRATORY DISEASE WITH A POSITIVE WASSERMANN TEST

To the Editor:—In the abstract from the article in *Medicine* (**23**:359 [Dec.] 1944) by Davies in THE JOURNAL, February 24, page 489, on false positive serologic tests for syphilis, Davies mentions the possibility of positive tests of this kind for certain types of atypical pneumonia. Moreover McNeil in the *American Journal of the Medical Sciences* (**209**:48 [Jan.] 1945) mentions his observations of atypical cases of pneumonia with strongly positive Kahn tests. Will you allow me in this connection to refer to a paper published in the *Helvetica medica acta* (**7**:497 [March] 1941) which may have escaped the notice of the authors, probably because of difficulties of communication caused by the war. After the observation of some sporadic cases by Lindau and Fanconi, I was able at that date to report 9 endemic and 10 additional sporadic cases and to show that one can speak of a nosologic entity with a characteristic symptomatology. I named the disease pneumonia with positive Wassermann test. Since that time it has been possible to supplement the symptomatology with more than 50 further observations (Gsell, Steinmann, Rossier, Pfisterer).

In most cases the disease shows a remarkably torpid course. Generally the temperature reaches only subfebrile values; high fever is found but rarely, whereas cases without any rise of temperature have been observed. Characteristic physical signs are those of a bronchitis such as dry and moist rales combined with signs of circumscribed consolidation. This can be important as a means of distinction from other atypical forms of pneumonia. The sedimentation rate of the red blood corpuscles is generally considerably elevated. The white blood cell count is normal. The percentage of polymorphonuclear cells is not increased, but there is a shift to the left. X-ray examination shows mostly one single, rarely more than one, very mottled not very dense shadow. Every lobe of the lung can be affected. The corresponding bronchopulmonary lymph nodes are often enlarged. Months can pass before the infiltration has entirely disappeared. The serologic tests remain positive approximately as long as the signs of consolidation last, but a strict parallel cannot be drawn. The serologic reactions can be more or less strongly positive.

Some patients present symptoms of the upper part of the respiratory tract including sinusitis without definite infiltrations of the lung. Therefore one might also speak of a respiratory infection with positive Wassermann test.

The contagiousness is striking. Endemics have been found in military units and in families. Etiologically a virus can be presumed, the bacteriologic examination of the sputum giving no clear results.

As to differential diagnosis, tuberculosis and syphilis in the first place must be excluded, which, given a sufficient time of observation, presents no difficulties because of the spontaneous disappearance of the symptoms.

R. HEGGLIN,
University of Zurich,
Switzerland.

EARLY DIAGNOSIS OF KALA-AZAR

To the Editor:—I was greatly interested to read the report of a case of kala-azar in an Italian prisoner by Colonel Sweeney, Major Friedlander and Lieutenant Colonel Queen in THE JOURNAL for August 4. The authors are to be congratulated on an excellent case study, but it seems unfortunate that the diagnosis was not made earlier and that splenectomy was necessary to make the diagnosis. This is undoubtedly due to the fact that physicians in the United States and medical officers in the armed forces are generally unfamiliar with this disease, which is not endemic in this country.

Since a number of cases of kala-azar have occurred in our armed forces, and since, because the incubation period may be as long as fifteen months, some symptoms are likely to develop even after discharge to civilian life, I should like to call attention to a few points which may assist in earlier diagnosis and thus be an aid both to the physician and to the patient.

Kala-azar should be suspected as the first probability, instead of the last, in any person who has been in one of the three great endemic areas and who presents a clinical picture of spiking daily fever, malaise and leukopenia. The three great endemic areas are the Mediterranean area, northeastern India and China north of the Yangtze River. The fever often, although not always, shows more than one spike of rise in twenty-four hours. The spleen may not be palpable until two months after the onset of symptoms. There may be no anemia, no abnormal rise of blood globulin, no prolongation of bleeding time or coagulation time, and the serum aldehyde test may be negative. Parasites cannot be found in the circulating blood. Malaria can be easily excluded by careful blood examination, and typhoid can be excluded by the usual tests.

The only method of making an early diagnosis is to find the Leishman-Donovan bodies in puncture material from the organs which become most heavily infected. Bone marrow puncture should be performed first, an attempt being made to obtain marrow tissue with as little blood as possible.

Parasites are often scarce in this material, but careful examination of Giemsa stained smears, referred to an expert labor-

tory, will often make the diagnosis. Culture of bone marrow material on NNN medium at room temperature, according to the technic in textbooks of tropical medicine or parasitology, will often produce demonstration of the flagellate forms within a week or two.

The liver is more likely to show parasites than the bone marrow, and liver puncture through one of the lower intercostal spaces, if properly performed, is practically without danger. The same general technic as for spleen puncture should be employed. The principal precaution is to make certain that the blood coagulation and bleeding times are within normal limits. If they are increased a blood transfusion will reduce them to normal.

Spleen puncture should not be attempted unless the spleen protrudes an inch or more below the costal margin.

I believe that if this disease is kept in mind by all physicians, and if proper diagnostic procedures are carried out before all the possible examinations for every other disease are conducted, diagnoses will be made much earlier than has been the case in the past.

HENRY E. MELENEY, M.D., New York.

ADMINISTRATION OF AMINO ACID DIGEST

To the Editor:—In the note "Fatality Associated with the Administration of Amino Acid Digest" by Curreri, Hibma and Cohen (THE JOURNAL, July 7) it is stated that "to our knowledge, no mortality has been previously recorded with the use of amino acids."

I wish to call attention to the paper by Hopps and Campbell, "Immunologic and Toxic Properties of Casein Digest as Prepared for Parenteral Administration" (*J. Lab. & Clin. Med.* **28**:1203 [July] 1943), in which is reported a death one hour after the administration of 200 cc. of 10 per cent amino acid solution (hydrolyzed casein). At necropsy it was determined that this patient had severe hepatic damage. The mechanism of this untoward reaction to amino acids was discussed and it was concluded that in patients with severe hepatic damage (e. g. acute toxic necrosis or diffuse hepatitis) parenteral therapy with amino acids might result in sudden death.

In the case reported by Curreri, Hibma and Cohen it is stated that "the liver showed slender hepatic cells, hepatitis and infiltration of portal canals with lymphocytes and occasional polymorphonuclear cells." This case would seem to confirm our previous observation and introduce an important contraindication to the parenteral administration of amino acids.

HOWARD C. HOPPS, M.D., Oklahoma City.
Professor of Pathology, University of
Oklahoma School of Medicine.

"WHOLE" OR "CITRATED" BLOOD

To the Editor:—Dr. Lewisohn maintains that the term "whole" blood, as suggested by Dr. Scannel, should include "citrated" blood. I respect the opinions of both of these men.

We have been using primarily "citrated" blood for twenty-three years in our obstetric service. I've always differentiated between "citrated" blood and "whole" blood because even though we have used adequate amounts of "citrated" blood, we have, during this period of time, had some 8 or 10 patients who continued to bleed from incisions. This bleeding was promptly stopped by the injection of 400 to 500 cc. of blood without any anticoagulant, the transfer being made by the multiple syringe method. The incidence of reaction has been slightly higher with citrated than with whole blood, but in neither instance have they been of great significance.

WILLIAM J. DIECKMANN, M.D., Chicago.
Chief of Staff, the Chicago Lying-In Hospital.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, Sept. 1, page 91.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Mar. 19-21. Sec. Dr. B. F. Austin, 519 Dexter Ave., Montgomery 4.

ALASKA: Juneau, September. Sec., Dr. W. M. Whitehead, Box 561, Juneau.

ARKANSAS:* *Medical.* Little Rock, Sept. 20-21. Sec., Dr. L. J. Kosminsky, Texarkana. *Eclectic.* Little Rock, Nov. 8. Sec., Dr. C. H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral.* San Francisco, Nov. 11. *Written.* Sacramento, Oct. 15-18. Sec., Dr. Frederick N. Scatena, 1020 N St., Sacramento 14.

COLORADO:* Denver, Oct. 2-5. Final date for filing application is Sept. 17. Sec., Dr. J. B. Davis, 831 Republic Bldg., Denver.

CONNECTICUT:* *Medical. Examination.* Hartford, Nov. 13-14. *Endorsement.* Hartford, Nov. 27. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, Nov. 13-14. Sec., Dr. J. H. Evans, 1488 Chapel St., New Haven.

ILLINOIS: Chicago, Oct. 9-11. Supt. of Registration, Department of Registration & Education, Mr. Philip Harman, Springfield.

KANSAS: Topeka, Dec. 6. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City 10.

MAINE: Portland, Nov. 13-14. Sec., Board of Registration of Medicine, Dr. A. P. Leighton, 192 State St., Portland.

MARYLAND: *Medical.* Baltimore, Dec. 11-15. Sec., Dr. J. T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 11-12. Sec., Dr. J. A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 20-23. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413-F State House, Boston.

MICHIGAN: *Ann Arbor, Sept. 11-13. Sec., Dr. J. E. McIntyre, 100 W. Allegan St., Lansing 8.

MISSISSIPPI: Jackson, Sept. 26-27. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson 113.

MONTANA: Helena, Oct. 1-3. Sec., Dr. O. G. Klein, First Nat'l. Bank Bldg., Helena.

NEW JERSEY: Trenton, Oct. 16-17. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO:* Santa Fe, Oct. 8-9. Sec., Dr. LeGrand Ward, 141 Palace Ave., Santa Fe.

NEW YORK: Albany, Buffalo, New York and Syracuse, Oct. 1-4. Sec., Dr. Jacob L. Lochner, Education Bldg., Albany.

NORTH DAKOTA: Grand Forks, Jan. 1. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: *Endorsement.* Columbus, October. Sec., State Medical Board, Dr. H. M. Platter, 21 W. Broad St., Columbus.

RHODE ISLAND:* Providence, Oct. 4-5. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH CAROLINA: Columbia, Nov. 13. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

SOUTH DAKOTA:* Pierre, Jan. 15-16. Sec., Medical Licensure, State Board of Health, Dr. Gilbert Cottam, Capitol Bldg., Pierre.

VERMONT: Burlington, March or April 1946. Sec., Dr. F. J. Lawliss, Richford.

WEST VIRGINIA: Charleston, Oct. 4-6. Commissioner, Public Health Council, Dr. John E. Offner, State Capitol, Charleston 5.

WISCONSIN:* Madison, Jan. 8-10. Sec., Dr. C. A. Dawson, Tremont Bldg., River Falls.

WYOMING: Cheyenne, Oct. 1-2. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

CONNECTICUT: Oct. 13. Address State Board of Healing Arts, 250 Church St., New Haven 10.

DISTRICT OF COLUMBIA: Washington, Oct. 22-23. Sec., Commission on Licensure, Dr. G. C. Ruhland, 6150 E. Municipal Bldg., Washington.

FLORIDA: DeLand, Nov. 3. Sec., Dr. J. F. Conn, Box 655, DeLand.

IOWA: Des Moines Oct. 9: Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MICHIGAN: Ann Arbor and Detroit, Oct. 12-13. Sec., Miss Eloise LeBeau, 101 N. Walnut St., Lansing.

MINNESOTA: Minneapolis, Oct. 2-3. Sec., Dr. J. C. McKinley, 126 Millard Hall, University of Minnesota, Minneapolis 14.

NEBRASKA: Omaha, Oct. 2-3. Dir., Bureau of Examining Boards, Mr. Oscar F. Humble, 1009 State Capitol Bldg., Lincoln 9.

SOUTH DAKOTA: December. Sec., Dr. J. D. Alway, Aberdeen.

TENNESSEE: Memphis, Sept. 24-25. Sec., Dr. O. W. Hyman, 874 Union Ave., Memphis.

WISCONSIN: Madison, Sept. 22. Sec., Prof. R. N. Bauer, 152 W. Wisconsin Ave., Milwaukee 3.

Society Proceedings

WAR WOUNDS OF THE SPINAL CORD

A Special Session, held at the Newton D. Baker Hospital, Martinsburg, W. Va., June 20, 1945

Foreword

BRIGADIER GENERAL FRED W. RANKIN, Chief Consultant in Surgery, U. S. Army: The highly effective manner in which the Medical Department of the U. S. Army is caring for and rehabilitating casualties who have suffered war wounds of the spinal cord represents one of the major medical achievements of this war. The gratifying results which have been and continue to be attained have been made possible by early surgical intervention following wounding in all cases in which there is the slightest doubt that the cord has been damaged, by as prompt evacuation to general hospitals in the United States as is compatible with the safety of the patients, and by the concentration of these cases in nineteen of the general hospitals of the United States where facilities for their specialized treatment have been provided and well organized programs for their convalescent care and rehabilitation have been developed. The high degree of integration and coordination which has characterized the efforts of surgical and medical specialists, nursing personnel, enlisted attendants, physical therapists, dietitians, occupational therapists and Red Cross workers has produced in these nineteen general hospitals a program of therapy, convalescent care and rehabilitation which in quality and effectiveness far surpasses that ever before afforded paraplegic patients. The energetic and cooperative efforts on the part of the personnel concerned with this program have made a notable accomplishment in a condition that has long been considered a grave and tragic problem.

The following symposium has been prepared by a number of authors whose unique experiences with the problem of spinal cord injuries renders them capable of speaking with unusual authority on this difficult subject. The papers of this symposium deserve the careful consideration of the profession, for a defeatist attitude in the care of patients with traumatic transverse myelitis can no longer be tolerated. Rehabilitation, when properly conducted, can and must establish a wheel chair life for the majority and walking with the aid of braces or crutches for many.

The Paralyzed Patient: Neurologic Aspects

MAJOR CHARLES W. ELKINS, M. C., A. U. S.: Prior to World War II there was no unanimity of opinion as to the therapy for a patient who had received a spinal cord injury. As a result of the increase in numbers of this type of injury since the advent of the war, the attention of many individuals in the Army Medical Corps has been focused on this problem. The Army Medical Corps has initiated certain concepts and principles in therapy which will serve as a guide post in the future for the treatment of a type of injury which is bound to be more numerous as our age becomes increasingly mechanized. Treatment begins from the moment of injury and does not cease until everything possible has been done to insure a satisfactory outcome. A definition of satisfactory outcome from a neurosurgical point of view means that it must be determined that further surgery is not indicated in order to permit or to aid in recovery of function to the spinal cord in both sensory and motor spheres. The patient must be free from pain. The patient must be relieved of incapacitating spinal reflexes and paraplegia in flexion.

The cause of pain following injury to the spinal cord may be relatively simple or somewhat obscure. Retained foreign bodies in close proximation to pain tracts or posterior nerve roots may be the etiologic factor. Arachnoiditis following trauma to the spinal cord may result in pain either generalized or girdle in character. Bony overgrowth, from healed fractures, impinging on nerve roots may be responsible for pain in certain cases. Involvement of the sympathetic nervous system may result in a most distressing type of pain.

Removal of retained foreign bodies and bony overgrowths is fundamental surgery when their presence has a reasonable chance of being the causative factor of pain. Alcohol injection of posterior nerve roots may be employed if the pain is segmental and the etiologic factors are obscure or the chances of relief by more direct methods slight. This procedure is not usually incapacitating unless employed in the low sacral region, where there is danger of interfering with bladder and bowel function. Alcohol injection into the subarachnoid space should be generally avoided because of the danger of upsetting the relationships of a bladder whose physiology is already precarious. Of the surgical procedures commonly employed, section of posterior nerve roots is the simplest and offers the best chance of success particularly in girdle type pain. Will the interruption of skin reflexes following section of certain posterior roots have deleterious effects on an autonomous bladder? If these more simple methods for relieving pain result in failure and involvement of the sympathetic nervous system has been discarded as the etiologic factor, a section of the spinothalamic tract may be employed. This is not a particularly hazardous procedure but has certain disadvantages. The tract is not on the surface of the cord and therefore the section cannot be done under direct vision. Certain pain fibers, therefore, may be left intact. Carefully performed, however, this procedure may result in relief of pain where other methods have failed. While patients of this type do not readily tolerate pain, neither do they tolerate extensive surgical procedures, and therefore following careful consideration of the cause of pain the simplest procedures available which would seem to offer the best chance of success should be employed in order to relieve this most distressing symptom. Out of a total of 69 spinal cord injuries, both complete and incomplete, as of the 1st of May, 24 had spinal reflexes, the severity varying from complete to mild incapacitation. Incapacitation must needs be defined when used in describing a symptom in a paraplegic patient. When one considers that the ultimate aim in the treatment of a paralyzed patient is some method of ambulation, it may readily be seen that automatic spinal reflexes and particularly the frequently coexisting complication of paraplegia in flexion may be considered incapacitating. A term which I have discarded but which is generally used to describe these phenomena is "mass reflexes." A mass reflex has been described as a maximal motor response in flexion to a minimal sensory stimulus in an animal with a transected spinal cord. My reasons for discarding this term are that not all of our patients with proved transections of the cord have maximal motor response to even strong sensory stimuli and indeed some do not have even minimal motor response. To continue this discrepancy further, we have observed patients with partially transected cords who demonstrate probably maximal motor response to minimal stimuli but the response is in extension and not in flexion. Thus I believe the term spinal reflex to be the more accurate term of the two. The mechanics of a simple and uncomplicated spinal reflex consists in sensory stimuli entering the spinal cord through the posterior nerve roots and, after transmission to a large number of anterior horn motor cells, emergence as efferent stimuli to motor groups. It would seem logical, therefore, that an interruption of this cycle would control spinal reflexes in the area involved, depending on where and over what extent the cycle was interrupted. This has been done on 3 patients at this hospital with success. Provided the patient is incapacitated and that all hope of spontaneous recovery has been abandoned, the procedure of anterior root rhizotomy which we have employed seems indicated.

A Plea for Exploration of Spinal Cord and Cauda Equina Injuries

LIEUTENANT COLONEL AUGUSTUS MCCRAVEY, M. C., U. S. Army, Neurosurgical Section, Wakeman General Hospital, Camp Atterbury, Indiana: Such authorities as Frazier, Lyerley, Mock, Oldberg Wechsler, Love, Munro, Coleman and Meredith, Kennedy and, more recently, Spurling have advocated exploratory laminectomy. With the present advances in surgery, the operative procedure can be done with a minimum of risk to life. Thirty-two laminectomies have recently been

done at Wakeman General Hospital, under local anesthesia, without a death or postoperative complication. If a conservative policy is adopted, it is difficult to select those cases which may be helped by surgery. The neurologic examination can reveal only the degree of physiologic interruption but not the extent of the anatomic lesion. The Queckenstedt test has been eliminated as a criterion in selection of cases for laminectomy by Mayfield. Poppen and Hurxthal have demonstrated that the Queckenstedt test gives a normal response as long as the lumen of the subarachnoid space is not less than the bore of the needle used. Likewise, x-rays of the spine are not always reliable. Depressed bone fragments into the neural canal are often found at operation with a previous negative x-ray report. At Wakeman General Hospital 71 patients have been admitted with penetrating wounds of the spine with spinal cord and cauda equina injury. Thirty-six still require routine paraplegia care, of which 18 are complete paraplegias. This report will be confined to that group of 36 still requiring paraplegia care. Thirteen had adequate previous operative treatment with the time between injury and surgery varying from three hours to twenty-five days. Five have shown partial return of motor and sensory function, of which 2 were cervical, 1 dorsal and 2 cauda equina injuries. Two patients not previously operated on are awaiting surgery, which has been deferred until adequate nutrition can be established.

The remainder of the 21 patients have had adequate exploratory laminectomies. Six were explored for foreign bodies in or adjacent to the neural canal. Two were bone fragments and 4 were shell fragments. Three showed neurologic improvement. Three had severe pain which was relieved by surgery. Seven were operated on for pain only. All were cauda equina and conus lesions, of which 4 were improved, 3 were only temporarily relieved and chordotomy is contemplated for this group. Eight patients have not had previous exploratory laminectomies. In 7 the dorsal cord and in 1 the cervical cord was involved. Two incomplete lesions showed definite improvement and 1 complete lesion is now showing movement of toes. The cause for operative treatment in the group with pain and foreign bodies is obvious and results are often gratifying. Of the group not previously operated on 6 showed complete physiologic interruption by neurologic examination and 1 of these was definitely improved. This is considered significant, since this group is usually considered hopeless. Much care has been taken in selecting and preparing these cases for surgery. Emphasis has been placed on the care and treatment of urinary tract infection and decubitus ulcers. No surgery is done until all nutritional deficiencies have been corrected and there is a balanced protein metabolism. This group of patients is anxious to have any type of surgery which may offer the slightest hope and will often ask for exploratory surgery.

DISCUSSION

MAJOR GEORGE MALTBY, M. C., A. U. S.: The complication of mass reflexes and spinal reflexes can be serious. I feel that the operation of anterior rhizotomy may be at times a life saving procedure. I have done one such operation on a man with pronounced flexion contractures. They had become so severe that he had had suicidal ideas. The operation in this instance was extremely successful. His legs have straightened out and I feel that he is making gratifying improvement. Once the spasms are controlled it is then possible to go ahead with the ambulation and further rehabilitation of the patient. It is important to use extreme conservatism in picking the cases for this operation. The question of the treatment of pain in the spinal cases has been a problem. I have seen a fairly large group of patients with cauda equina lesions and severe pain in the lower extremities. The majority of these cases are much relieved by exploration of the cauda equina, which I believe has the same results as neurolysis in certain painful peripheral nerve lesions. I have tried sympathectomy for relief of this type of pain in 2 instances without benefit. The method of choice in relieving the pain in this group of patients is a high dorsal chordotomy.

LIEUTENANT COLONEL FRANK MAYFIELD, M. C., A. U. S.: I should like to say a word of caution with regard to rhizotomy and other destructive operations designed for the control of massed reflexes. Cases that require this operation are rare, and it should be deferred for at least a year after injury unless there is absolute proof that the cord has been completely transected. Many of these tend to become less forceful and less easily excitable with the passage of time. It seems that the attending doctor is more anxious to do something about these massed reflexes than the patient or the nurses and attendants who care for them. Unless these reflexes are definitely interfering with nutrition or the care of the skin and bladder, I don't believe such an operation should be done.

LIEUTENANT COLONEL CONDICT W. CUTLER, M. C., A. U. S.: During the past year 67 patients of this type have been admitted to Cushing General Hospital. Ninety-two per cent of cord injuries were caused by gunshot wounds and shell fire. Eight per cent were crushing injuries. Of 64 patients 3 had cervical spine injuries, 44 dorsal spine injuries and 17 lumbar spine injuries. Twenty-five per cent had incomplete paralysis with sufficient motor function of the legs to permit walking with braces. Two who had complete paraplegia on admission developed nearly normal recovery in three months' time. All patients on admission had paraplegia or paraparesis of a flaccid type. From three to nine months was required for a return of deep reflexes and Babinski. The sensory level was sharply demarcated. Twelve patients presented complete sympathectomy effect. Twenty showed increased sympathetic tone with cold moist feet. All but 1 had flaccid paralysis of the bladder. Three patients with priapism had contusion rather than transection of the cervical or dorsal cord. To date no case which on admission showed no flicker of motion in the foot or leg has shown any improvement up to one year's hospitalization. Only 2 cases of cauda equina lesion which showed no flicker of motion on admission showed later improvement. In 67 cases of paraplegia, 34 laminectomies have been done overseas. Fourteen laminectomies were done in this hospital because of total manometric block or in order to determine prognosis and the justification for anterior root resection of the lumbosacral roots to diminish spasm. All laminectomies at Cushing were discontinued in December 1944, as directed by the Surgeon General. In 48 cases of laminectomy, both those done overseas and here, the following findings were recorded: 10 cases, transection; 14 cases, normal cord; 11 cases, contused cord. In 48 cases of laminectomy 16 eventually improved, and sufficient function developed to permit walking. Twenty-two have shown no improvement in one to twelve months. It is to be inferred that these 22 cases of nonimprovement include the 10 cases of transection and some of the cases of contused cord. Fourteen laminectomies done at Cushing Hospital were late operations, generally several months after injury. The findings were about equally divided between normal appearing cord, transection of the cord and contused cord. Four have shown improvement.

LIEUTENANT COLONEL BARNES WOODHALL, M. C., A. U. S.: Neurologic opinions concerning these problems are fairly well established. There is no question that we have a definite responsibility to relieve pain, although it must be admitted that this symptom may vary considerably from patient to patient. The pain associated with the presence of large foreign bodies is a clearcut syndrome and is easily relieved. In cauda equina lesions neurolysis will often diminish the pain sometimes encountered in such patients. I have been impressed by the operative relief of this type of pain noted in overseas reports. I agree with Lieutenant Colonel McCravey that chordotomy is an operation that we have used too infrequently. We have very little to lose with this procedure and the results have been good in the hands of competent surgeons. I am in complete accord with Major Elkins concerning the problem of reducing mass spinal reflexes. The problem, however, is not always as simple as that demonstrated by his patient. In these severe instances where the spinal injury is complete anterior rhizotomy must be done. In the incomplete cases conservative measures of restraint should be followed together with the entire regimen of paraplegic care. Such spinal reflexes then have a tendency toward spontaneous resolution. Exploratory laminectomy in uncomplicated spinal cord lesions is of dubious value. One should not expect neurologic improvement at a late date. Among 35 cases of paraplegia in which operation

was performed within a time period of three hours to five days after injury, 57 per cent showed improvement. Among 386 cases in which operation was performed at a later date in base general hospitals, 10 per cent showed improvement. Colonel McCravey has reported but 1 case showing evidence of improvement out of 6 late after injury. In other groups of cases of paraplegia in which operation was performed three to four months after injury there was failure to show neurologic improvement which could be correlated with the operative procedure. Any objection to exploratory laminectomy naturally does not apply to cauda equina lesions, in which the presence of foreign bodies, depressed bone fragments, inadequate early operation or pain appears to be an indication for exploration.

Lieutenant Colonel Spencer Braden, M. C., A. U. S.: I agree with Colonel Woodhall that discretion should be exercised in the selection of cases for operation for the relief of mass reflexes. We have, at Nichols General Hospital, been trying very hard to dodge the issue of operation in this type of case. We have recently, at the suggestion of one of our internists, Capt. David F. James, been using curare in an effort to control the painful spasms in these cases. We were fortunate in obtaining the cooperation of the Surgeon General's Office in this matter. We have used the drug in varying doses of from 10 to 100 mg. in 5 cases. It is too early to formulate a definite opinion, but we do feel that it may possess very definite possibilities. This drug has been used by anesthetists in conjunction with general anesthetic agents for the purpose of promoting greater muscular relaxation. One patient has been relieved of his painful spasms for as long as ten to fifteen hours. Prior to its administration he had experienced great difficulty in obtaining a night's rest, and physical therapeutic procedures were exceedingly difficult because of the reflexes. We have observed no contraindicating deleterious effects even after administration of 100 mg. of the drug. Slight transitory diplopia has been complained of, with an associated feeling of slight unreality. In the evaluation of results of operative intervention in cases of paraplegia a sharp line of distinction should be drawn between the cauda equina and the spinal cord. The cauda equina has the characteristics of and is in essence a peripheral nerve and one would therefore expect it to behave in a similar manner. It can withstand trauma and be expected to recover, whereas the same situation in the spinal cord proper would be hopeless.

Major Charles W. Elkins: I am glad that the feeling toward conservatism has been made evident. The 3 cases of rhizotomy performed at this hospital were on proved complete lesions. One might consider the possibility that posterior instead of anterior rhizotomy be performed to control spinal reflexes. Dr. Frazier did this in 1911 on a patient with spastic paraplegia, syphilitic in origin. The patient did not live long enough to permit evaluation of results, and no autopsy was performed. To my knowledge nothing further has been reported on this procedure and I think it should probably be considered.

The Paralyzed Patient: Urologic Aspects

Captain Boris P. Petroff, M. C., A. U. S.: At Newton D. Baker General Hospital 70 patients with spinal cord injuries have been received since September 1944. These include complete and partial traumatic myelitis at levels from the seventh cervical down to cauda equina injuries. Forty of these had suprapubic cystostomies performed overseas. This report deals with these 40 patients with suprapubic cystostomy and the reestablishment of urethral voiding in 17 of them. Urea nitrogen and carbon dioxide combining power are obtained and intravenous urograms, which are extremely valuable as a matter of record so that a comparison may be made with later plates in case a febrile reaction develops as the result of urinary complications. The suprapubic tube is checked for its adequacy, changed if necessary and connected to the closed system, manually controlled type of drainage and irrigation, so that the patient can irrigate himself with the M citric acid buffered solution (Suby and Albright: *New England J. Med.* **228**:81 [Jan. 21] 1943). As soon as the patient's condition warrants it, the suprapubic tube is removed, the sinus packed and a urethral catheter is inserted. We use a small caliber catheter such as a No. 16 or No. 18 French, with added holes cut in its tip for better drainage in an attempt to avoid the occurrence of periurethral abscesses and epididymitis. Of the 38 patients changed from suprapubic drainage to catheter drainage in the past nine months, 6 have developed periurethral abscesses at the penoscrotal junction followed by fistula formation, and 4 have developed epididymitis, 1 of which was bilateral. Another patient who had both abscess and epididymitis came to orchiectomy. These periurethral abscesses occurred during use of the 22 F. Foley self-retaining catheter in an attempt to avoid using adhesive tape on the penis, especially because priapism tends to pull the straight catheter out. These abscesses might have been avoided if smaller catheters had been employed or if a No. 18 self-retaining 5 cc. bag catheter had been available instead of the larger sizes. Catheters of large size may cause necrosis of the urethral mucosa at the penoscrotal angle and lead to abscess formation. A urethral fistula which heals slowly, rivaled in slowness only by the perineal urethrostomy, represents a decided handicap to the spontaneous activity of which some of these six bladders are now capable. An attempt is being made now to speed the closing of these fistulas by suture with stainless steel wire, and it is difficult to state at this time what the eventual status of patients with this complication will be.

As for epididymitis, we recently had a case which developed even though no catheter over No. 16 was ever used. The question has come up regarding ligation of the vas deferens in conjunction with a urethral catheter to prevent epididymitis, but the youthful age group and the possible effect on the patients' morale have been against it. They all hope for an active sex life.

The change from suprapubic tube to urethral catheter is always a big lift to a patient's morale, as the cystostomy is repugnant to most of them. The sinus heals in from two to six weeks. A cystourethrogram is done as a matter of record. Cystometric readings are taken as soon as the cystostomy heals and sometimes through the cystostomy tube if there is not undue leakage around it. Cystometric curves have been very valuable in differentiating between the hypotonic bladder and the hypertonic small bladder aggravated by mass reflexes. These mass reflexes are a great problem, as urine escapes around the catheter and keeps the patient wet whenever the bladder contracts spasmodically. The cystometric curve also indicates when the patient has established a reflex bladder and the catheter can be dispensed with. The main procedure in rehabilitating the bladder in establishing a reflex bladder of good capacity is institution of tidal drainage apparatus. The Stewart-Munro modification is the one used here and has given very good results.

Of the 38 patients who have been placed on urethral drainage in this hospital, 30 have had tidal drainage apparatus irrigating and exercising their bladder for one to three months. Seventeen are voiding now with little, if any, urinary residual and all have shown increased bladder capacity, which has advanced most of them from 50 to 75 cc. to 300 to 400 cc. bladder volume as contrasted to 1 who did not get tidal drainage and remained with a small capacity bladder and a suprapubic cystostomy. Of the remaining 8 patients on urethral drainage without tidal irrigation, 4 had cauda equina injuries and 4 are those whose cystostomies have not yet healed. In time, with tidal drainage, we expect those patients with complete cord lesions to void by reflex action. So far, those with high thoracic or cervical transverse complete myelitis seem to be the slowest to respond to automatic irrigation. Those with partial myelitis have resumed bladder activity in three to four months. While on tidal irrigation, the constant inflow and outflow of M solution keeps the bladders clean and the walls elastic. M solution has been the best for irrigating purposes. It is composed of citric acid buffered with magnesium oxide and sodium carbonate and has a p_H of 4.5. Although it will not completely prevent calculus formation in the bladder or destroy bacteria, it has given better results than 0.5 per cent acetic acid or boric acid, which we used at first.

The most pressing problem in keeping these paralyzed patients alive and reasonably well is to combat urinary infections attended by chills, fever and calculus formations. All our urinary flora now contain Aerobacter aerogenes, Proteus vulgaris and Bacillus pyocyaneus and occasionally Escherichia coli. The staphylococcus and streptococcus have been cleared up by penicillin therapy. After each chill and elevated temperature, a blood culture is taken. We have had three positive blood cultures, two for Aerobacter aerogenes and one for Proteus vulgaris, later followed by Bacillus pyocyaneus. All three became negative in three to four days following increased doses of penicillin, blood transfusions, relief of ureteral obstruction and forcing fluids, as well as supportive measures such as the oxygen tent, and digitalis therapy administered by the medical service. The gram-negative organisms which infect the urinary tract cannot be eliminated by penicillin as can the staphylococcus and streptococcus groups. They also have urea-splitting properties, causing the formation of alkaline calculi in the bladder and kidneys. Of 40 catheter or cystostomy patients who have had intravenous pyelograms and observation cystoscopies of the bladder, 28 had bladder stones of varying size and hardness, composed of calcium and magnesium carbonate and phosphates. All these urines contained Aerobacter aerogenes and Proteus vulgaris. These calculi are ever present. Patients with suprapubic drainage had them and after they had been removed and urethral drainage had been instituted within a few months they had recurred in the bladder. These bladder stones are easily removed by the Ellik evacuator through the panendoscope sheath, but the larger ones have to be crushed first with a visual lithotrite. Demineralization of the bones in recumbent patients as demonstrable by osteoporosis in x-rays, resulting in increased calcium salts in the urine and stasis in the bladder due to incomplete emptying by catheter, especially the Foley bag catheter, which may allow puddling of urine behind the retaining balloon, may account for these bladder calculi, but the gram-negative urea splitting bacilli are the probable factors at the bottom of this stone formation.

The treatment of upper urinary tract infection has been difficult. Of 43 paralyzed, bedfast patients, 8 have developed renal calculi. The paralyzed patient with a high spinal cord lesion cannot localize renal pain, and the diagnosis of renal calculi depends on intravenous urograms, which are taken as soon as the patient develops abdominal distress, vomiting, distention, chills or fever. Of these 8 patients with kidney stones, 2 have had to have operations for urethral obstruction. One had to have a nephrectomy because of cortical abscesses and stone, and the second had a pyelolithotomy and since has had another stone obstructing the ureter. Three others responded to more conservative measures of passing a catheter up to the obstructed kidney as, fortunately, the calculi were small. One death was due to a pyonephrosis and lung abscess as well as to ureteral calculi, the culture of the renal abscesses showing Aerobacter aerogenes. Penicillin, sulfonamides and blood transfusions combined with general medical and surgical care have served to keep these patients alive so far by combating streptococcic and staphylococcic infection.

Aseptic care of the catheter tidal drainage apparatus and collecting bottle and tubing are taught to each corpsman in the ward. Two specialists are on duty all the time for urologic care only. The patient himself is instructed as to how to avoid contaminating his catheter in an attempt to reduce the incidence of infection. The paralyzed patient will be most benefited by general building up of his resistance to infection, and the urologist will do the most good by conservative treatment and careful watching and waiting, using every diagnostic and therapeutic method at his disposal to forestall ureteral obstruction and blood stream infections, hoping to avoid complications until a time when the patient can dispense with catheters and be on his own with a reflex bladder or voluntary voiding.

In summary, of 70 patients with spinal cord injuries, 40 who had suprapubic cystostomies have been, or are being, placed on urethral drainage, which has enabled 17 of them, so far, to empty their bladders by voiding with little if any residual. Urethral catheters caused complications, such as periurethral abscesses in 6 cases and epididymitis in 4 cases of the total of 38 with urethral indwelling catheters. Urinary infections have been predominantly due to gram-negative organisms, and formation of bladder calculi was high. Renal calculi were found in 8 of the total 70, mostly among the 43 seriously injured patients whose physical activity has been limited.

Patients with spinal cord injury who have had suprapubic cystostomy for transportation purposes overseas should be given a chance to reestablish some form of voiding through the urethra. This is done by inserting a urethral catheter of small caliber and instituting tidal drainage. The complications of the urethral catheter, such as periurethral abscesses with fistula formation and epididymitis, can be partly reduced by avoiding the use of any catheter over No. 18 French in size. The patient's condition must be good before the change from suprapubic to urethral drainage is made. The end result of a good percentage of voiding patients would seem to justify this course of action. Urinary infections can be controlled by sulfonamides, penicillin and the new antibiotics which help to destroy gram-negative organisms. Urologic complications of the upper urinary tract must be expected and constant watch kept for renal calculi and abscess formation. These are treated in the most conservative fashion. The urologic management of the paralyzed patient is a constant struggle against many odds, but the end result of a voiding, upright, infection free individual is worth the fight.

Associated Complications in War Wounds of the Spine

CAPTAIN WILLIAM C. WARD and MAJOR G. L. MALTBY, M. C., A. U. S.: At present there are 32 cases being cared for jointly by the neurosurgical and genitourinary sections at the Ashford General Hospital, White Sulphur Springs, W. Va. The entire group had, in addition to the usual decubitus ulcers and urinary tract pathologic conditions, associated injuries to the peripheral nerves and peripheral blood vessels, compound fractures, traumatic amputations, penetrating wounds of the chest and penetrating wounds of the abdomen requiring colostomy. Spastic disorders in the complete and near complete cord lesions have likewise been quite a problem.

The following cases represent the less common problems that have appeared in this group:

CASE 1.—*Fecal fistula through the spine.* On July 6, 1944 a private sustained a shell fragment wound of the spine in the region of the fifth lumbar vertebra. On July 7 a laparotomy was done. The amount of injury to the intestine is not described; however, he had generalized peritonitis at the time. A cystostomy was done for rupture of the bladder. The wound in the region of the lumbar spine was debrided. Later he was found to have drainage of fecal material through the wound in the lumbar region. He also had drainage of feces and urine from the suprapubic tube. On July 29 an exploratory laparotomy was done, and a loop of small intestine was found to communicate with the bladder. The source of drainage of feces through the wound in the back was not found. Postoperatively the patient did very well. However, the upper end of the abdominal incision opened and drained fecal material but no urine. Physical examination revealed a midline abdominal incision with drainage of fecal material and pus from the lower portion. There was an extensively scarred wound measuring 3 by 4 cm. in the midline of the back at the level of the second lumbar vertebra. Immediately beneath this scarred area was an area of fluctuation, and pressure on this caused purulent material to be expressed from the wound. There was pronounced atrophy of all the muscles of both lower extremities. However, the patient was able to move the toes of both feet a little. There was an area of anesthesia over both buttocks and the posterior aspect of both thighs. On numerous occasions he had noted the passage of gas through the draining wound in the lumbar region. On December 4 a barium enema was given and the film showed a fistulous tract extending from the distal portion of the sigmoid superiorly into the region of the fourth lumbar vertebra. On Feb. 5, 1944 the draining sinus was injected with iodized oil. This revealed that the sinus extended into the

fifth lumbar interspace and proceeded through the sacrum to enter the intestinal tract. Films made one hour later revealed oil in the sigmoid. On March 15 two small pieces of bone extruded from the wound in the back. He continued to have a considerable amount of purulent drainage from this wound in addition to gas. On April 7 a transverse colostomy was done. There has been less drainage from the wound in the back since that time; however, the patient does continue to pass a small amount of gas occasionally through this wound. Further exploration is now considered.

CASE 2.—*Urinary fistula through spine.* On June 1, 1944 a private sustained a shell fragment wound of the spine in the region of the fifth lumbar vertebra with immediate paralysis of both legs and a rigid abdomen. Exploration revealed a large retroperitoneal hemorrhage. A pyelogram revealed an injury to the left ureter. On July 25 an exploration was made of the left ureter and a foreign body was removed. A catheter was inserted into the ureter. Examination revealed several draining wounds over the back in the region of the fifth lumbar spine. There was a complete paralysis of the entire right lower extremity; however, the patient showed some function of the left quadriceps muscle. There has been urinary drainage from the wound in the back. An intravenous pyelogram did not reveal any definite injury to the left ureter. Following this the patient's general condition gradually improved. Most of the wounds on the back healed. One small area continued to drain purulent material and intermittently drained urine. On Feb. 10, 1945 the sinus was injected with iodized oil. The sinus tract passed down through the left sacroiliac joint and proceeded to enter the left ureter near its distal end; the oil then ascended the ureter to the level of the fourth lumbar vertebra. Films made twenty-four hours later showed a small amount of oil in the left kidney and in the bladder. The intravenous pyelogram was repeated on February 14 and revealed a small stone in the ureter apparently at the site of the fistula. Urine continued to drain from the sinus and could be demonstrated by methylene blue given by mouth. On March 14 the left kidney was removed. There was no further drainage of urine from the wound in the back. However, there persisted some drainage of pus. On May 2 the sinus tract was explored and several small fragments of bone were removed.

CASE 3.—*Chronic recurrent meningitis.* On Nov. 19, 1944 a private sustained a shell fragment wound of the spine in the region of the third lumbar vertebra. He had immediate complete paralysis of the lower extremities. A laminectomy was done and a small shell fragment was found lying alongside the cord, with laceration of the third lumbar root. Postoperatively the patient was able to move the feet and legs a small amount. He developed a spinal fluid fistula at the site of the original wound. On December 16 the spinal fluid drainage stopped and the patient became quite ill with high temperature (104 F.), stiff neck and rapid pulse. He stated that he had been having a low grade fever and had had frequent severe left frontal headaches since the middle of December. Examination revealed a small, well healed wound just to the left of the spine in the region of the third lumbar vertebra. There was a well healed laminectomy wound which extended from the first lumbar to the third lumbar. There were weak contractions of both quadriceps muscles. No other motor function was noted. There was hypesthesia over both lower extremities below the level of the second lumbar dermatome. There was an extreme degree of emaciation. On Jan. 29, 1945 an intravenous pyelogram revealed slight hydronephrosis of the right kidney; the left kidney was completely blocked. It was thought that the persistent fever and extreme emaciation were due to this. On January 31 the left kidney was removed and found to contain thick pus and abscesses. Postoperatively the patient felt much better and appeared improved. Ten days later he developed sudden onset of severe left frontal headache. This was associated with a rise in temperature to 103 F. A spinal puncture was done which revealed a white cell count of 4,408, with 99 per cent polymorphonuclears. Culture of the spinal fluid was negative. During the next two days the temperature subsided. Two days later a spinal puncture revealed a white cell count of 800, and culture revealed Bacillus pyocyaneus. The patient's condition gradually improved. On March 15 the patient developed a temperature of 104 F., became irrational, with a pulse of 160, and appeared critically ill. Spinal puncture revealed 2,000 white cells. The next morning the patient's temperature was 99 F., he was rational, and he appeared greatly improved. On March 26 he had a similar episode, with a temperature of 102 F. On April 15 he again had a similar episode of headache, slight fever and stiffness of the neck. X-ray of the lumbar spine revealed no sequestrum. Under local anesthesia on April 26 a small area of the laminectomy wound was opened. The epidural fat was edematous, but no pockets of pus were found. A drain was placed in the extradural space. Since that time the patient has shown slight improvement but has had one mild attack of headache associated with fever.

These cases represent uncommon complications as found in 88 cases of spinal cord and cauda equina injuries. Injection of draining sinuses with iodized oil has helped in determining the extent of the cavities, their locations and frequently the indicated treatment.

DISCUSSION

CAPTAIN HAROLD LIPSHUTZ, M. C., A. U. S.: In treatment of paraplegic patients at Wakeman General Hospital we have found that cystoscopy is a necessary procedure. This has been impressed on us because of the great number of cases arriving at our hospital from overseas with bladder calculi. Recently, 5 out of 7 cases presented multiple bladder calculi at the time of admission to the hospital. Cystoscopy should be done as soon after arrival of the patient as is possible, preferably within forty-eight hours. There is a point that should be stressed concerning the time of removal of all catheters. Cystometric readings, although valuable, cannot be depended on, because the most important factor is the presence or absence of spasm of vesical sphincters. When the sphincters are fully relaxed, the Cunningham incontinence clamp suffices for urinary control. In the presence of good detrusor function, accompanied with refractory spasm of the vesical sphincters, it is possible that electrical destruction of the sphincteric control will be the answer. I should like to ask one question of the neurosurgeons: We have always been taught that automatic bladder function or voluntary bladder control cannot be attained in the presence of destruction of the third sacral nerve supply to the urinary bladder (nervi erigentes), yet our best results with return of voluntary bladder control have been in cases of recovering partial paraplegia in which these nerves have been damaged.

LIEUTENANT COLONEL CONDICT W. CUTLER, M. C., A. U. S.: Indwelling urethral catheters in these cases are undesirable because of complicating infections and epididymitis. Bladder function has not returned more rapidly when urethral catheters have been employed than with suprapubic drainage. Drainage through the perineal urethrotomy wound has proved satisfactory in that it provides good drainage and is not associated with complications. Such wounds have closed rapidly after removal of the catheter. The number of cases in this group has been too small to justify the drawing of conclusions. Tidal drainage has succeeded, where appropriate, in keeping the bladder clean and free of infection. It has been the general observation that the development of automatic bladders is rather slower in these paraplegic cases than in civil practice. It has been proposed that better and more rapid results might attend the use of a perineal urethrotomy with indwelling catheter, permitting the secondary surgical closure of suprapubic cystostomy wounds once infection has been controlled. It is believed that the automatic bladder would develop more rapidly under these conditions.

CAPTAIN GEORGE O. BAUMRUCKER, M. C., A. U. S.: I should like to discuss some of our results in these cases from my services at the Gardiner General Hospital and the Hines Veteran Hospital in Chicago. An unusual complication was presented in 1 of these cases resulting in death. The bullet that transected the spinal cord cut the right ureteropelvic junction and lodged in the diaphragm. Skiodan injected into the bladder refluxed back up into both kidneys, explaining the pyelonephritis. Dye injected into the right flank fistula showed extravasation into the right flank and made a pyelogram of

the right kidney. Both trochanters were protruding through large hip ulcers. Excision of these made nursing care easier, but the patient's course was rapidly downward and he died in spite of penicillin, plasma, blood transfusions and sulfonamide drugs. This new information that we have now regarding the large amounts of serum protein loss from these bed sores may be the factor in prolonging the lives in similar cases and preventing this severe emaciation, which too often occurs in these cases with large bed sores. We do not use tidal drainage. We use a closed system of bladder lavage set up with a special two way clamp. It is fool proof, is simple and needs no specialized care. It can be easily taken care of both by patients and by nurses. Pressure of the fingers allows the bladder to be filled, and release of the pressure allows fluid to run out of the bladder. By this technic we are able to correct the spastic and small capacity bladder, so that, when automaticity does set in, the bladder will have a bigger capacity and be more elastic. We use a cystometer which registers full bladder pressure and volume simultaneously. It has been our experience that those bladders with 100 to 150 cc. volume that can exert a pressure of over 40 mm. of mercury pressure either reflexly or by intra-abdominal pressure will successfully empty to a low residual and need no further catheter drainage. Urethral catheters get along about as well as suprapubic catheters and sometimes better if the suprapubic catheters leak, provided the urethral catheters are changed frequently and kept clean and irrigated. Otherwise, of course, if neglected periurethral abscesses are common. For the most part the cystostomy tubes inserted overseas are properly placed and located and fit well. However, those very few that were found unsatisfactory were so because of three reasons: 1. Too low an insertion in the abdominal wall, causing pressure of tube against symphysis pubis with, of course, the potential danger of bone involvement. 2. Too low an insertion in the bladder itself, causing pressure of the end of the catheter against the trigone, which often produces spasm and discomfort. 3. Lack of support of the bladder to the rectus muscle, causing a false pocket of urine between the bladder and the abdominal wall, making replacement of the suprapubic catheter very difficult.

CAPTAIN JAMES SEMANS, M. C., A. U. S.: At McGuire General Hospital we have over 30 paraplegic patients with catheters in place. Twenty of these have suprapubic drainage. Suprapubic cystoscopy has proved to be a valuable procedure. By passing the cystoscope through the suprapubic tract, it is possible not only to examine the interior of the bladder but also to remove encrusted mucosa and stones. My impression is that the patient has less cystoscopic reaction than by the transurethral route. The drainage of the bladder with the suprapubic catheter has been improved a great deal by rolling the patient on to his abdomen while irrigating the catheter. The gravitation of the exudate toward the suprapubic catheter facilitates its removal. In the supine position only the supernatant exudate is removed. I can see a problem, namely whether or not it is preferable to allow the sinus tract to close early and to treat the bladder transurethrally or to treat the bladder suprapubically until it is permanently free of exudate and stones, and then to allow the sinus tract to close, reasonably expecting to have no more difficulty afterward.

Urinary Calculi in Recumbent Patients

MAJOR JAMES J. JOELSON, M. C., A. U. S.: In a period of seven months we have encountered 31 cases of urinary calculi in recumbent patients at the Crile General Hospital. In 26 the primary cause of recumbency was a compound fracture, usually with osteomyelitis, of one or more long bones of the lower extremity or of the bones of the pelvis. Four patients had severe injuries to the abdominal viscera. Eighty-nine per cent were casualties from the European theater of operations, indicating that a tropical climate is not necessarily a factor in the formation of renal stones of recumbency. The shortest period of recumbency was one month and the longest was nine months, the average being four months. The shortest period between the initial injury and the onset of urinary symptoms was three months and the longest was nine months, with an average of four and one-half months. Twelve of the 31 patients had a single calculus, and 19 had multiple stones. In 23 of the patients the stones were unilateral and in 8 they were bilateral. They varied in size from 2 or 3 mm. to 2 cm. in diameter. All of the 31 patients had hematuria, either gross or microscopic, but only 13 showed any pus in the urine, and of these only 5 had a serious infection. The p_H of the urine before treatment was started varied between 5.5 and 7.5, with an average of 6.5. The stones were demonstrable by x-ray in 24 cases (about 77 per cent). In the other 7 cases the diagnosis was proved by the passage of one or more stones. The analysis of the recovered stones showed them all to be calcium stones; 70 per cent were calcium phosphate and 30 per cent were calcium oxalate. Seventy-five per cent of the phosphatic stones showed also the presence of some oxalate, and 50 per cent of the oxalate stones showed traces of phosphate. Only one stone in this series showed a positive test for sulfonamides. The serum calcium, blood phosphorus and phosphatase (alkaline) were normal in all of the cases. The Sulkowitch test for the amount of calcium in the urine was done in 12 cases and found to be definitely elevated in 4 (33 per cent), indicating that a hypercalcinuria may persist in some of these patients for more than two months. The great majority of our patients were treated conservatively. They were placed on a high fluid intake of at least 4,000 cc. a day. The acidity of the urine was increased by means of a high acid ash diet, and, if the daily p_H determinations indicated it, the diet was augmented with ammonium chloride. Also these patients were got out of bed as soon as this could be safely accomplished, and if this was not possible an effort was made to change their position in bed frequently. Cystoscopy was avoided if possible in the uninfected cases, although cystoscopic manipulations were utilized when infection had already occurred or when there were definite indications for this form of treatment. By this general scheme of therapy satisfactory results were obtained in a high percentage. In 1 case a most dramatic result of dissolution of the bilateral stones was obtained; in 16 cases the stone or stones were all passed; 4 patients have either passed some of their stones or have shown a decrease in the size of the stones; 2 have shown no improvement and will probably require operation; 5 will undoubtedly require surgical intervention, and 3 have already been operated on. Solution G (Suby and Albright) has been used for 4 patients, through either a nephrostomy tube or a two-way ureteral catheter, without any appreciable results. In this series of cases there were two deaths from renal insufficiency and severe pyelonephritis.

The enforced recumbency acts in two ways: first by causing a hypercalcinuria and second by allowing the sediment that forms in the calices to remain there and increase in size. Another factor which seems to favor the formation and growth of these calculi is the infection which is present with the complicating osteomyelitis. The possibility of sulfonamide crystals as the primary nidus for the formation of these stones must be seriously considered. They were found in only one stone; the other stone in the same renal pelvis did not contain any sulfonamide. The acidity of the urine is another extremely important factor in the formation of these stones. Calcium phosphate, which is present in most of the stones of recumbency, will precipitate in an alkaline urine but will usually remain in solution in an acid urine.

During the first phase of the condition, the treatment may be outlined as follows: 1. Fluid intake. 2. Diet: (*a*) a high acid ash or neutral ash, (*b*) elimination of milk, (*c*) elimination of fruit juices, (*d*) vitamins. 3. Medication: (*a*) urinary acidifiers, (*b*) urinary antiseptics. 4. Movement of the patient. 5. Laboratory studies necessary for the proper diagnosis and treatment. Milk should be eliminated, for this food definitely increases the amount of calcium excreted in the urine, and it has been demonstrated that a high calcium diet will double the urinary output of calcium. Another dietary error consists in giving these patients large amounts of fruit juice, since it is believed by some that the contained vitamins are beneficial to proper bone repair. If this is true, the necessary vitamins could easily be given in pill or capsule form and thus the alkalization of the urine by the fruit juices could be avoided. The ingestion of large amounts of both fruit juice and milk results in a highly alkaline urine containing large amounts of calcium, the most perfect combination

possible for the formation of renal lithiasis and for the continued and rapid growth of the stones. The diet should have a high vitamin A content.

It is advisable that frequent microscopic examinations of the urine be done so that the infection can be recognized early and proper steps taken. The sulfonamides are probably the most useful drugs in the treatment of these infections. Sulfacetamide shows the greatest solubility in either an acid or an alkaline urine and therefore does not form sulfonamide crystals in the renal pelves or calices around which further stones may form. Movement of the patient, either active or passive, is essential. Patients who are completely immobilized should be turned at least once a day, if possible, in an effort to allow the dependent minor calices to empty themselves of any sedimentary particles which may have collected there. As soon as it can be safely accomplished, these patients should be got out of bed and encouraged to take as much active motion as their disability will allow. The Sulkowitch test is a relatively simple procedure which gives a fairly accurate indication of the amount of calcium contained in the urine and may be an aid in determining whether the acid regimen is causing an increase in the hypercalcinuria. In 258 consecutive cases of fractures of the lower extremity, routine films of the urinary tract were done. In not one of these was there a calculus demonstrated which had not been suspected because of clinical symptoms or microscopic hematuria. It seems, therefore, that repeated microscopic examinations of the urine will be more helpful than an occasional routine x-ray film in detecting these calculi of recumbency.

The treatment of the second phase of renal calculi of recumbency presents the urologist with many difficult and serious problems. These patients should immediately be placed on the therapeutic regimen outlined for the first phase and thoroughly studied. Unless there are definite contraindications, they are kept on this treatment for months. During this time the acid urine may completely or partially dissolve some of the stones and many of the stones will be passed spontaneously. Seventeen of our 31 patients have already passed or dissolved all their stones. Cystoscopy should be avoided if possible in all uninfected cases because the danger of introducing infection into the fertile soil of these urinary tracts is a definite possibility and the superimposed infection makes the condition infinitely more serious. Surgery should be delayed if possible until conservative treatment has been given an adequate trial and until the patient's general condition is such that surgery can be safely undertaken. Also it is desirable to have had the patient out of bed for some time before operating and thus overcome the hypercalcinuria, with its tendency toward reformation of stones. X-ray evidence that the stones have stopped increasing in size or number is reassuring information to have before operation, since it indicates that the chance of recurrence is much less. Occasionally, however, the surgeon's hand will be forced by various conditions or complications which will necessitate surgery before these optimum conditions are obtained. The type of operation to be done will be determined by the conditions present and by the experience and judgment of the surgeon.

Nonsurgical Treatment of Urinary Stone

Major Frank C. Hamm, M. C., A. U. S.: The various methods of nonsurgical treatment of urinary stone are of value principally in the prevention of stone formation. Once a calculus has formed and has obtained sufficient size to be of clinical importance, its removal is accomplished best by surgery. The disposal of urinary stones, either by dietary measures or by any of the dissolving solutions, should be reserved for only those cases in which surgery is contraindicated. Our experience to date, while limited, has not been encouraging with stone dissolving agent solution G, owing principally to the irritation of the solution and to the discomfort of the treatment imposed by the long period required, especially with the indwelling ureteral catheter method.

For prevention of stone, the following procedures may be safely recommended:

1. Increased fluid output, a minimum of 2,500 cc. each twenty-four hours. This would probably require an average intake of about 4 liters.

2. A high calory, high vitamin diet. The p_H of the urine should be checked so that the diet can be regulated to prevent the urine from becoming neutral or alkaline. The routine use of an acid ash diet is not recommended at the present time.

3. Eradication of foci of urinary infection.

4. Stasis. Surgical treatment is required for anatomic obstructions. Stasis of immobilization and recumbency must be corrected by getting these patients moving earlier. An erect position, either sitting or standing, should be stressed. Patients immobilized by casts and apparatus should be turned on a Stryker frame. Turning a patient every two hours is not enough.

5. Urinalysis once a week to detect urinary infections.

6. Hyperparathyroidism. In recurrent stone cases urinary calcium determinations should be made following a three day calcium free diet.

7. Dissolution. In instances in which stones have already formed, attempts at dissolution should be made only when surgery is contraindicated. It should be given discontinuously, and preferably through a nephrostomy tube. The use of enzymes (urease) is not recommended.

The application of these principles has greatly reduced the recurrences of stone and in an occasional instance has been credited with the dissolution or disappearance of the stone.

DISCUSSION

Major Roth, M. C., A. U. S.: I should like to show x-ray films taken of unusual types of stones in recumbency. I have never seen this type of case in civilian practice. The first patient was a man aged 23 with a fracture of the femur. He had been in bed for six months. He had no urinary symptoms, but, in routine check of the urine, red blood cells and white blood cells were found. A flat x-ray plate and intravenous pyelogram showed a column of sedimentary stones impacted in the lower third of the right ureter, causing obstruction and diminution of function of the right kidney. Fortunately, the patient passed these crystals of sedimentary calculi spontaneously. Following this the kidney function returned promptly. The second patient was a young man who had fractures of the femur and of the shoulder and who had been recumbent for six months. He was asymptomatic until he was allowed out of bed, whereupon he developed severe left renal colic. In spite of sedation, the colic continued. The flat film of the kidney, ureter and bladder showed an impact of sedimentary stones in the lower third of the left ureter, the column extending from the bladder upward for about 4½ inches. Because of the continued colic, which no sedation would alleviate, cystoscopy was done, but the catheter could not be passed above the column. We continued to treat him conservatively without results. He continued to have colic and a rise in temperature up to 103 F. accompanied by chills. A second cystoscopy was done and a number 5 ureteral catheter was passed up to the left kidney pelvis with great difficulty and left in situ. The urinary drip was definitely hydronephrotic. He continued to have severe colic without any drop in temperature and it was felt that the column of stones would have to be removed. We felt that, if we could remove the bottom of the column, the rest of the sediment would pass spontaneously. This was done cystoscopically and was successful. We obtained 320 mm. of gravel. In addition, the patient had bilateral renal calculi and was therefore placed on a high acid ash diet with great quantities of liquid. Subsequent x-ray examination showed the kidneys free from calculi.

Major Abel J. Leader, M. C., A. U. S.: Prophylaxis is probably the most important consideration in these cases. A program of prophylactic management in recumbent patients should be both clearly defined and generally adopted. In a survey of 576 unselected orthopedic patients at Fletcher General Hospital our preliminary figures indicate that of these 212 had abnormal urinary findings. One hundred and fifty cases showed only the presence of a microscopic pyuria, while 62 others showed the presence of various combinations of pus, blood, casts and albumin. Two months immediately following immobilization is the "critical" period. It has been shown that a hypercalcinuria exists for the first sixty days or so after immobilization starts. Because of the time lag between the

first immobilization and the time we see these patients in the general hospitals in the zone of interior we do not have control of the patient during the so-called critical period. It usually takes about two to three months between the time the patient is injured and his hospitalization in the United States. Therefore the prophylactic program during this early period becomes a responsibility of the lower echelons of medical evacuation such as the field and the evacuation hospitals. Here hypercalcinuria, stasis and alkalization of the urine can be effectively combated by a regimen which involves the ingestion of large quantities of water, usually not less than 4 liters a day. Stasis can be effectively combated by turning the patients from the dorsal to the ventral recumbent position for one hour periods at least every two hours. A neutral ash and not a high acid ash diet is advised during the first two months of immobilization, because the use of the latter results in an increase in the hypercalcinuria. By ordinary standards we may think that when a recumbent patient gets 2,500 cc. of fluid per day he is getting enough, but actually because of the hypercalcinuria a relative dehydration exists which requires an intake of at least 1,500 cc. more in order to aid effectively in the elimination of the calcium which otherwise might be precipitated. Fruit juices have an alkaline residue which adversely affects the p_H of the urine, and their use should be prohibited. The use of milk should also be discouraged because it too merely increases the amount of calcium which must be excreted by the kidney, which is already pouring out increased amounts. As regards the management of recumbent patients in the general hospital in the zone of the interior, the same principles must be followed through. Now, however, because there is no longer a hypercalcinuria a high acid ash diet is advisable, since keeping the urine acid and dilute is our objective. Fluid intake must be carefully watched and at least 4,000 cc. taken daily. Frequent change of position and ambulation at the earliest possible time are necessary. The patient in a hip spica must be turned at very frequent intervals and, if in traction, as much free movement of the unimmobilized parts of the body as is possible must be encouraged. A routine kidney, ureter and bladder film is indicated in all cases with a history of recumbency of two months or longer on first coming out of plaster, especially in those in which any abnormal findings have been noted. In those cases in which stone has actually formed to any demonstrable degree, frequent x-ray check-ups at six month periods for at least two years are advisable in order that the serious late effects on the kidney may be avoided.

DR. W. H. TOULSON, Baltimore: The stones that seem to be most troublesome are located in the lower end of the ureter. They will not pass spontaneously; they become larger and cause damage and infection to the ureter and kidney of the affected side. In some instances dense strictures occur in front of these stones that make ureteral dilation by means of a bougie or catheter impossible. It is well known that a normal ureter implanted in another position in the bladder usually offers no problem, but in this infected and dilated type of ureter, where the blood supply is poor, attention must be paid to the details of implanting the ureter. The operation that I present is useful in situations of this character. I have had occasion to use the operation successfully only six times.

MAJOR S. L. RAINES, M. C., A. U. S.: At England General Hospital we care for many patients who are recumbent, since we are an amputation and neurosurgical center. I should like to bring up one matter that has not been mentioned. We are all agreed that just recumbency, with or without amputation or infection, causes calcium to leave the bones and become excreted by and deposited in the kidneys. The underlying cause of this change is not fully understood and will require careful and thorough investigation by workers trained in such procedures. I would suggest that in addition to all the work being done on caring for these patients, after stones are formed, we consider the problem of preventing such movement of the body calcium. It is a biochemical process and I believe a biochemist and such other technical help as is needed could be assigned to study this problem in one of our hospitals where so many men are confined to bed for long periods. Few, if any, civilian groups would have the cases available for such periods of time as our army hospitals have just now.

COLONEL CLAUDE BECK, M. C., A. U. S.: At Fletcher General Hospital I found that Major Leader had been assigned to the fracture ward of the orthopedic service. In a period of six weeks he picked up 13 patients with urinary calculi. This experience suggests the advisability of having a urologist in the orthopedic section so that these complications will be detected. I am interested in the possibility of a nidus for a stone being developed in a patient without showing any evidence of the stone while he is in the hospital. The possibility exists that these patients might develop stones in the urinary tract after they are separated from the Army. This is a problem which may present itself in the future.

MAJOR PETER W. SWEETSER, M. C., A. U. S.: If all this physiology and pathology is true, then the physiology of exercise is true. The use of class IV physical reconditioning will combat stasis and sluggishness. It cannot be proved that kidney stones will be immediately prevented or cured, but exercise in bed is an important adjunct to other treatment. At Newton D. Baker General Hospital we have been giving class IV physical reconditioning routinely to patients in bed. These patients feel better than those who do not have any exercise. They are very receptive and seem to look forward to it. I recommend strongly that the individual medical officer give more attention to the use of physical reconditioning for his patients. The system has been laboriously organized; why not accept its benefits?

DR. JOHN E. HOWARD, Baltimore: Recent observations on the metabolism of calcium in patients at bed rest and in casts and those suffering fractures may be pertinent to this discussion and perhaps change our orientation in our therapeutic efforts. Previously healthy patients with fractured femurs, at bed rest in casts, excrete steadily increasing amounts of calcium in the urine up to a period of approximately thirty days, at which time such calcium excretion reaches a plateau level where it is maintained for a long time, presumably until mobilization of the patient takes place. Smaller increases of urinary calcium occur when healthy patients are simply put to bed in casts without fracture. Studies have been made of the effect of various dietary changes during the plateau period of greatest calcium excretion on such fractured patients and were to me very surprising. A diet which contained minimal quantities of calcium, for example 0.2 Gm. daily, was carried on for a period of a week or two and then changed to one containing 2 Gm. of calcium or higher in the form of milk. Then the original diet was resorted to again for a period of observation. There was little or no change in the amount of urinary calcium excretion following these dietary changes. Even if calcium in the form of lactate was given in large amounts, but little increase in the amount excreted in the urine was found. Doses of vitamin D far in excess of the usual therapeutic levels also seemed to make but little difference in the amount of calcium which appeared in the urine. I was unable to detect any change in the urinary calcium excretion from the administration of sulfonamide compounds. Thus one wonders whether the strict elimination of milk and vitamin D from the diet and the restriction of sunlight to these patients is really serving the desired purpose. Under the circumstances of bed rest and immobilization for fracture, the bones rarefy and the movement of lime salts out of such bones is transferred from the blood to the kidneys and is excreted via the urine. The excess quantities of calcium thus appearing in the urine must surely be a major factor in the production of stones in these patients. These stones are almost invariably calcium phosphate or carbonate in character. We have as yet no true idea of the circumstances or stimuli which induce bone cells to make new bone or what stimuli induce bone resorption. It seems very likely that the bone cells themselves are metabolically active in both of these procedures. We do know crudely that one stimulus to bone formation is exercise of the part and that immobilization or reduction of blood supply is conducive to bone resorption. Certain general stimuli also bring about bone resorption—for example acidosis and parathyroid hormone. Efforts should be made to determine the fundamental stimulus which is active in bone resorption in these patients. If it could be found, we might eliminate it and hence prevent atrophy of disuse. This would be getting at the problem at its

source. Should such fundamental information become available, we might be able to eliminate the problem of stone formation in these patients, at least reduce the problem of stone formation to the same level of frequency as occurs in the populace at large.

Dr. Hugh Jewett, Baltimore: Dr. Howard has stated that his studies have shown that urinary calcium is not increased by the addition of milk to the diet. However, milk is exceptionally rich in phosphorus. According to Dr. Fuller Albright of Boston, per gram of protein, milk contains three times as much phosphorus as muscle. Since the stones under discussion are practically always composed of calcium phosphate, should or should not milk be excluded from the diet of these patients because of its high phosphorus content?

Captain Boris P. Petroff: I should like to answer Colonel Gage about thrombophlebitis. There were 2 cases, 1 from overseas with a terrifically big thigh, the other with a swollen leg which was assumed to be thrombophlebitis. I am surprised that there has been no question of suprapubic cystotomies, because when these patients first came in with a suprapubic tube in them it was mainly on the suggestion of Major Elkins that they were changed from suprapubic to urethral drainage. Major Elkins did a firm bit of insisting. I was all for leaving the suprapubic tubes in, but Major Elkins said to go ahead with the removal of suprapubic tubes. We made the change, the first patient developed epididymitis, and Major Elkins said to let it stay in—that it wouldn't hurt him. He is one of our prize patients, voiding with an automatic reflex bladder. As to periurethral abscess, we end up with a fistula and, when the patient begins to void, the urine runs out over the floor like a watering can. This is a great problem to us, and I should like the visiting urologists to suggest some way of repairing this penoscrotal type of fistula.

Major James J. Joelson: In answer to the question concerning renal stones in Negro soldiers, we have seen none but we have had very few Negro patients. The points raised by Dr. Howard are interesting and important. Flocks has shown, however, that a high calcium diet will increase the amount of calcium excreted in the urine. Also the phosphorus content of milk must be considered, and since most of these recumbency stones are calcium phosphate it would seem much wiser and safer to eliminate milk from the diet, or at least keep its intake at a reasonably low level. Although ammonium chloride may mobilize calcium from the bones, still in some cases a properly acid urine will cause a dissolution of the stones which have already formed. If the patient can be kept under proper observation, the use of this drug seems justified in an effort to obtain the very desirable result of dissolving the stones.

Major Frank C. Hamm: We have had no cases of stone in Negro patients included in the series referred to in the paper. I can recall only 3 instances of urinary stone in the Negro soldier. These instances were observed before our present survey was carried out. I do not know how many patients we have seen or what the ratio to the white patients has been. It is my belief that the relative absence of stones in Negro troops is due to a racial factor rather than to their acid ash diet, as the food in the Army is the same for all soldiers. Pulvertaft has observed an increase in calcium output following prolonged exposure to sunlight in recumbency cases, and he advises against excessive exposure to sunlight. These observations should be repeated. We should not adopt a policy of excluding heliotherapy from these patients. I cannot believe that a moderate amount of sunlight is harmful.

Surgical Treatment of Decubitus Ulcers

Captain Donald E. Barker, M. C., A. U. S.: Of the 21 patients in this series 10 had only 1 ulcer; 5 had 2 ulcers, 4 had 3 ulcers and 1 had 5 ulcers. The ulcers ranged in size from 1 by 2 inches to 6 by 8 inches, covering the entire area over the sacrum. Seven patients had ulcers over one or both hips. As soon as a definite line of demarcation became apparent, the necrotic tissue was dissected away with scissors. From that time until grafting the ulcers were dressed with either boric acid ointment, urea ointment or an emulsion made by mixing 4 cc. of penicillin in 1 ounce of petrolatum. The appearance of the ulcer was not affected greatly by the type of ointment used. When the ulcers had a clean base the operations were done. No attempt was made to get the areas bacteriologically clean. Split thickness skin grafts $\frac{12}{1.000}$ inch in thickness were used in 16 cases. The granulating area was shaved down to a yellow base when possible and the graft sutured into place. In a number of cases the ulcer was so close to the bone that no incision of the granulation tissue was possible. In all of the cases wet dressings were used for four days after operation. The principal problem met here was the inability of the patients to remain in one position for any period. In the constant changing of position by the ward personnel the dressings were moved about and accounted for the loss in some grafts. One patient with five large sores was grafted three times without success. His daily protein loss from the sores was 50 Gm. a day, and there was reversal of the albumin-globulin ratio.

A total of 30 operations have been done to date. Sixteen of these were skin grafts and 7 primary closures, 2 by basket weaving and 5 by rotation of a flap. Of the 30 cases 19 are healed at the present time; 27 per cent of the ulcers have about 50 per cent closure, and of the 30 cases there were 3 complete failures. In the rotation flap and the primary closure series the results were better than those in which split grafts were done. This is probably due to the fact that the split skin grafts were used in large ulcers and also in cases in which the condition seemed too poor to permit extensive radical surgery. Of the primary closures and rotation flaps 80 per cent healed after the first operation.

The following types of closures are recommended: In large ulcers of the back; i. e. those measuring about 4 inches in diameter, and also in cases in which there is extreme debilitation, split thickness skin grafts are the method of choice. In small ulcers measuring from 1 to 3 inches over the back the method of choice is excision of the ulcer and closure at the time of operation. In ulcers of the hip, skin grafting is not recommended. Even in the smaller ulcers of the hip it is recommended that a rotation flap be done. In ulcers from 1 to 2 inches in diameter a rotation flap with primary closure of the donor area is the method of choice. In large ulcers a large rotation flap to the ulcer area with split thickness skin graft of the donor area should be used.

It is estimated that the time saved in these ulcers varies from six months to two years, and in some of the larger ulcer areas it is probably a life saving measure to use split thickness skin grafting. An ulcer about 1 inch in diameter may take six to nine months to heal, whereas ulcers of the back such as some shown in this series without surgery would probably not be healed after five years. I believe that the excision enclosure of even as small ulcers as three fourths of an inch in diameter that have penetrated to the subcutaneous tissue should be done.

Primary excision and closure of small ulcers of the back is the method of choice. In large back ulcers or in patients who are very poor risks surgically skin grafting is successful and the recommended method. In hip ulcers a rotation flap is a quick method of a permanent closure.

The Nutritional Aspects of the Care of the Paralyzed Patient

Captain Harold A. Harper, Sn. C., A. U. S.: It is now well recognized that malnutrition may occur as a result of disease or injury. The majority of paralyzed patients have lost a considerable amount of weight, particularly in the atrophic paralyzed extremities. Many also present evidences of generalized emaciation. The nutritional deficiencies of these patients are due to a number of factors. On admission to hospitals in the zone of interior nearly all have large, oozing, decubitus ulcers which are a source of considerable loss of protein. Infection is a common complication, with the result that depletion of reserves is accelerated. It is most important, therefore, that immediate attention be directed to an evaluation of the state of nutrition of these patients and that methods for correction of the malnourished state and the maintenance of an optimum level of nutrition be instituted. Protein losses by exudation may be extremely large: up to 50 Gm. in some cases. The so-called toxic destruction of protein, which is a concomitant of disease or injury, may account for considerable loss and, together with the wear and tear quota, one may find that more than 150 Gm.

of protein a day will be necessary to achieve nitrogen balance. The underlying injury or pathologic process may decidedly influence the mechanisms responsible for blood and tissue protein synthesis. A study of the blood proteins of these patients frequently reveals increased globulin and decreased albumin levels. This may be the only objective evidence of protein malnutrition, but it is to be considered as indicative of extensive depletion of protein stores. Recent studies have indicated that there is a definite metabolic partition between the plasma and the rest of the body. It is stated that each gram loss of plasma protein is accompanied by a loss of about 30 Gm. of tissue protein. When regeneration takes place, only 3.5 per cent of the nitrogen retained is used to replenish serum albumin, while 96.5 per cent is allocated to replace tissue protein stores. This explains why large quantities of protein may produce relatively little improvement in plasma albumin levels.

To use a determination of the total plasma protein as a diagnostic aid for assay of the state of protein malnutrition, one must take into account two important factors. For under certain conditions a normal value will be reported when there is actually protein depletion. These factors are (1) the effect of dehydration and (2) the presence of decreased levels of albumin accompanied by an increased globulin. As plasma protein diminishes, the water retaining power of the blood is also decreased. Fluid is lost to the tissue spaces, and increased concentration of the plasma will occur with a consequent decrease in total plasma volume. Quantities of protein which would be low in a normal plasma volume would then appear normal or even elevated. Conversely, when the concentration of the serum albumin is raised there will be an increase in the plasma volume, averaging about 17 to 18 cc. per gram of albumin retained. One clinical study reported increases in plasma volume of 600, 800 and 900 cc. in patients receiving 50 Gm. of albumin. Therefore as one replenishes plasma protein stores there will be a shift in fluid balance so that, for temporary periods at least, an increasing plasma volume will have the effect of reducing the actual concentration of protein.

Again, one may find that total protein is normal but actually there is hypoalbuminemia which is masked by an increase in globulin. This is particularly true where there is chronic infection, most of the increase occurring in the gamma globulin fraction, rich in antibodies. To obviate these pitfalls, red cell counts and hematocrit determinations should be obtained simultaneously with the plasma albumin and globulin in order to estimate the probable degree of dehydration. Although much emphasis has been placed on albumin globulin ratios, the plasma albumin content is actually the significant factor involved.

Correction of nutritional deficiencies in these patients may be expected to enhance greatly the success of all aspects of their care. Healing of the decubitus ulcers will be favored, as will the success of grafting procedures. As the extensive losses of protein from this source are diminished, it will become progressively easier to restore and maintain nitrogen balance. The patient can be expected to combat more successfully the chronic infection to which he is exposed. The efficacy of chemotherapeutic agents will be enhanced and wound healing materially improved.

The basal diet of these patients can ordinarily be the regular high protein diet of the hospital if there is no obvious impairment in their ability to digest or assimilate it. If the diet is properly consumed, one can probably depend on a daily nutritional intake of about 2,800 calories and 100 Gm. of protein. A much larger daily intake of protein will often be necessary to compensate for the losses in exudates as well as those of normal and abnormal metabolism. Additional protein must be allowed for the synthesis and replenishing of body proteins. One should set a protein objective to be attained daily by these patients—possibly 150 to 175 Gm., or more if tolerated. The other components of the diet are depended on to supply as much energy as possible in order to spare protein to a maximum degree for use in anabolic reactions. It may be desirable to increase vitamin supplementation. In the presence of anemia most of the administered protein is diverted to the synthesis of hemoglobin and it is not until the anemia has been corrected that satisfactory tissue and plasma protein regeneration will occur. In these situations the use of whole blood is of value. To correct an acute deficiency of plasma protein, especially where there is frank edema, the administration of plasma or plasma albumin is ideal. But, in a chronic hypoalbuminemia due to malnutrition, plasma is of value but may be disappointing. For every gram of plasma protein which remains in the blood possibly 30 Gm. is removed by the rest of the body. To supply 2,000 Gm. of protein for the entire body requires 30 liters of plasma (120 donors).

From a nutritional point of view it would seem more physiologic to supply good quality protein in a more economical and assimilable form. This can be achieved by the use of certain protein concentrates or hydrolysates, several of which are commercially available. Two are hydrolysates of casein, the protein of milk, and are available for both oral and intravenous use. A third is a mixture of wheat, beef, milk and yeast proteins, for oral use only. It is usually possible and desirable in all of these cases to confine alimentation to the oral route. In addition to the advantage of providing as normal a regimen as possible, one must consider the fact that individuals whose plasma protein levels are dangerously low cannot tolerate intravenous fluids with impunity. To administer 100 Gm. of protein, as a 5 per cent Amigen solution, for example, requires the introduction of 2 liters of fluid. Such a procedure will not be well tolerated if continued for some time.

It is advisable that patients requiring intensive nutritional care be recommended to the attention of one dietitian who will be specifically assigned to the task of supplying adequate nutrition in these cases.

DISCUSSION

LIEUTENANT COLONEL CONDICT W. CUTLER, M. C., A. U. S.: Forty-five of 67 patients admitted to Cushing Hospital had bed sores. Two of the 67 had slight progression of their bed sores after admission. No patient has developed a bed sore following entry. The bed sores are characteristically multiple; thus there have been 130 decubitus ulcers in the 45 patients. Important considerations in treatment have been found to be constant and repeated turning of the patient every two hours day and night, the use of small kapok pillows to prevent local pressure on sensitive areas (supporting the chest and pelvis on pillows in a prone position makes for comfort and better breathing), keeping patients dry at all times, adequate nutrition and attention to avitaminoses and protein deficiencies. In local treatment various applications have been tried, including petrolatum gauze, penicillin jelly, granulated sugar and a preparation of concentrated red cells with penicillin and agar. Of these the granulated sugar has proved particularly effective in diminishing pyocyaneus infection and slough. Epithelization seems to be rather more rapid under this treatment. Cleansing of the wound and rapid development of granulations of a healthy character have followed the use of a paste composed of concentrated red blood cells thickened with agar and containing penicillin. Associated with this type of preparation, secondary closure has been used in 17 cases and has proved most satisfactory in deep penetrating bed sores measuring not more than 7 cm. in diameter over the sacrum and 5 cm. in diameter over the trochanter. Penicillin is given forty-eight hours preoperatively and twenty-one days postoperatively. The wound is cleansed with saline solution, the edge of the decubitus trimmed away with complete undermining of the entire skin and subcutaneous tissue over the sacrum and low back out to the flanks for a distance of 8 to 10 inches, superficial to the gluteus muscle. Closure of the circular defect is performed with tantalum 0.010 suture in two layers, one for the deep fascia and one for the skin. No drain is employed. The wound is filled with penicillin solution, and the same solution is injected through the suture line into the wound area twice a day for ten days. Stitches are left in place for twenty-one days. In trochanter decubitus the treatment is the same. Three layers are usually required in the suture, as the sore frequently extends through the fascia lata and the gluteus maximus fascia. These are closed separately from the subcutaneous and skin layers. A plastic extension is always necessary. When complete suture closure has

been effected there has been no case of reopening or breaking down. Slower healing occurred in those cases which could not be completely closed.

Lieutenant Mark A. Jacobs, M. C., A. U. S.: Most of these patients come to us in a poor state of nitrogen balance and in mild acidosis. They have a hypoproteinemia with a reversal of the normal albumin-globulin ratio, avitaminoses, calcium metabolic changes with the formation of renal and cystic calculi, infected kidneys and bladders, and necrotic skin ulcers. The skin ulcers were a large possible source of inanition and nitrogen imbalance. These decubitus ulcers varied in size and number but in all cases were infected and oozing. Through the use of cellucotton dressings of these ulcers we were able to obtain sufficient material for our experiments. By covering these ulcers with the pads for twenty-four hours and then doing a micro-Kjeldahl determination on the material contained on the pads, we found that these ulcers did have an important bearing on the nitrogen balance, hypoproteinemia and albumin-globulin ratio. One patient with 5 ulcers was found to have a total protein loss from these of over 40 Gm. in twenty-four hours. A tremendous increase in protein intake is necessary to obtain a zero balance, much less achieve a positive one, since to this ulcer loss must be added nitrogen loss through the usual sources, such as urine, feces and perspiration. Also add to this the anorexia and one can see how our problem becomes increasingly difficult of solution. As infection from all sources was brought under control, the nitrogen balance gradually tended toward zero and the albumin-globulin ratio showed improvements, but maintenance of infection control was almost impossible. A partial solution to the problem was found in the use of skin graft coverings for the decubitus ulcers. Where and when this was done, the protein loss through these ulcers became negative. The patient tends toward and approaches a positive balance and the albumin-globulin ratio tends toward normalcy. We are attempting to clear up all sources of infection. But there still remains the question of how to get enough proteins, enough calories and enough vitamins into these patients.

Ambulation and Support

Captain J. E. Cameron, M. C., A. U. S.: In the treatment of paraplegia we define ambulation as the ability to get about by means of braces and crutches proficiently enough to care for oneself at home; to carry out the necessities of ordinary life without help.

The following expected results justify the initiation of an early and vigorous program of ambulation for each patient with a spinal cord injury:

1. The morale factor: Any advance in the ability of these patients to get about either in a wheel chair or on crutches causes an immediate improvement in their general outlook on life, their appetite and their general health.

2. Therapeutic exercise: In our 70 cases, 49 are incomplete or recovering. In many cases the prognosis cannot be given, even after direct inspection of the lesion at the time of laminectomy, and it may be many months before any recovery takes place. It is in this group of cases (which in our series represents 70 per cent) that the very early initiation of a program of ambulation is of immeasurable benefit. This benefit is derived from the passive exercise obtained in the swinging movements of otherwise paralyzed lower extremities. No amount of artificial or assistive physical therapy can make up the equivalent of such exercise.

3. Neurologic changes: For some unexplainable reason weight bearing on the feet seems to overcome pronounced clonus and involuntary mass movements seen in recovering cord injuries.

4. Improvement in general nutritional vasomotor functions: The resumption of the upright position is a great benefit in the general bodily tone and cardiovascular status.

The program at the Newton D. Baker General Hospital consists of (1) exercises to strengthen the muscles of the upper extremities used in crutch walking, with particular attention to the triceps and muscles of the shoulder girdle; (2) braces, which are ordered on the patient while his bed sores and bladder are being treated (in cord lesions with little or no function in the abdominal musculature a thoracopelvic girdle is necessary); (3) a walker (the standard army walker is used, with a crutch type arm support); (4) crutches. Patients with high lesions require prolonged and tedious instructions in the art of paralytic walking. Normal walking is a complicated process for any biped animal. The only phase of the normal gait seen in a paralytic patient is that which takes place as the non-weight bearing extremity is allowed to swing, like a pendulum, forward; the paralytic gait is therefore fundamentally a succession of alternating pendular movements. Propulsion is obtained by the tripod action of each of the two crutches and the braced lower half of the body. Such walking involves swinging the pelvis and lower extremity by either the thoracic cage or the abdominal musculature, the force being transmitted through the braces. Since the gluteus medius muscle is paralyzed, it is necessary that the patient lean far to one side in order to raise the opposite extremity off the ground. This makes for a grotesque overmovement at first, which requires long practice before it is eliminated.

Any patient with a cord lesion at or below the tenth dorsal vertebra should be got into braces promptly and without waiting for recovery of muscle function below the lesion. We can extend to such a patient the hope of ambulation with crutches provided his upper extremities are intact. Patients with cord lesions as high as the second dorsal (provided their upper extremities are intact) may with prolonged practice and instruction be able to get around in braces, but to these patients we give a more guarded prognosis. For those patients with high lesions unable to use the walker, we initiate a prompt wheelchair program. The simple change of posture and the additional exercise incurred in moving a wheelchair are a great benefit to the patient.

The question of amputation of the lower extremities for irrecoverable loss of function as in paraplegia has been raised. The Council on Physical Medicine of the American Medical Association advises that amputation be performed only if simple amputation will offer a better prognosis in terms of appearance, comfort and function and if a sufficient part of the extremity possesses enough useful function to work well in a prosthesis. Certainly few, if any, cases of paraplegia would meet these requirements unless complicated by extensive bone or vascular damage.

In summary, early initiation of a program of ambulation for paraplegic patients raises their morale. Physical therapy may overcome clonus and mass movements in partial lesions and improve the nutritional state and vasomotor tone. Such a program consists of exercises for the upper extremities, the early fitting of braces and supervised instruction in paralytic ambulation, starting in a walker and progressing to crutches.

The Daily Care of the Paralyzed Patient

Lieutenant Colonel David Henry Poer, M. C., A. U. S.: The days when the patient who had received a spinal cord injury with resulting paralysis was treated as a troublesome and hopeless invalid are definitely over. The men of the Army Medical Corps can point with pride to the fact that they have led the way in bringing about such a complete reversal of this attitude and action and that they have met the issue with all the resources of the medical profession. The basis for the everyday routine in caring for the paralyzed patient at the Newton D. Baker General Hospital, Martinsburg, W. Va., is the purposeful development of a strong patient-doctor relationship. All matters of every nature, all supervision and management is directly the responsibility of the one doctor-officer under whose care these patients are placed. All personnel responsible for the care of these patients work directly under his authority. He must be familiar with everything that is being done for his patients. This relationship becomes of inestimable value to the patient himself in that he finds that he has a firm post to tie to and to spring from on his road back to a reasonably satisfactory mode of living. The time and method by which the doctor establishes, builds up and cements this relationship are during the daily ward rounds. These must be regular and systematic, at least

once daily, including Sundays and holidays. Other rounds made in the evening have proved to be of immense value, since those hours are usually free from the hurry, bustle and rush of the average hospital day and it is during these periods that the patient learns that his doctor not only knows his problem but also knows the solution. The complexity of the problem of the paraplegic requires this unusually time consuming program, but it pays large dividends in a manner not to be obtained otherwise.

The most important member of the treatment team is the hospital corpsman or ward attendant. We have given these men and women special training in the handling and care of paralyzed persons. The duties of these attendants are chiefly concerned with the care of the bladder and bowel, changes in position of the patient and aid in ambulation. Assistance is also given in the changing of bed linen and mattresses and in feeding the patient. The use of special frames for turning the patient (Stryker) have not been found necessary when the attendants carry out their duties properly in shifting the areas of pressure on the body.

The next in this therapy group are the technicians, who carry out physical therapy, and all this work blends readily into a reconditioning program consisting of exercises that will give the individual the necessary massive shoulder girdle to substitute for leg motion. Special urologic technicians or male nurses carry out all but the simpler procedures necessary to keep the urinary tract free from infection. Brace makers, Red Cross social and recreational workers, librarians, education and vocational instructors are some of the many workers needed.

The nurse shares with the doctor the responsibility of carrying out the necessary details of treatment and must be his listening post and intelligence department to acquaint him with all information, to advise and to make suggestions as are needed in order to obtain the desired results. She must supervise the work of the attendants and technicians.

In addition to the recreational programs given by Red Cross personnel, attention must be paid to their religious needs. Chaplains pay daily visits, and effort is made to take the patient to the chapel services. Personal guidance and counsel are provided to take care of all legal and business matters as well as domestic problems, where adjustments must be made by wife, children and other family members. An educational program is set up to fit the needs of each individual, and this must fit into the vocational plans to provide a livelihood after discharge.

Since the original injury is to the spinal cord, it is with the neurosurgeon that the launching of the original plan must rest. The urologist has more actual daily contact with the patient until an automatic function of the bladder has been established and infection brought under control. The internist, especially the nutrition expert, has his important function, the results of which are hastened by successful plastic surgery by closure of the decubitus ulcers. The orthopedic and the general surgeon likewise have their part in the treatment of associated conditions or complications.

Nothing has been said about the field of research which has been opened by the study of the results of this type of injury. The control of decubitus ulcers has been partially solved by increase in our knowledge concerning protein and nitrogen metabolism, and attempts are being made to control or prevent infection in the urinary tract. The sulfonamide drugs and penicillin have been of inestimable value, but the problem of the gram-negative organisms remains. Further information concerning calcium metabolism is required, as well as all metabolic processes in paralyzed tissues. Good morale in a paraplegia ward can best be obtained by treating patients in groups and perhaps later in a specially constructed and equipped colony where they can become self supporting and by following the outline just given. This will convince the patient and his family that everything is being done to cure his immediate ailments, get him to walking again, develop a degree of bladder and bowel control, teach him a gainful occupation and discharge him promptly. After that the morale factor of the paraplegic becomes no factor whatever.

The Future of the Paraplegic

LIEUTENANT COLONEL CALEB S. STONE, M. C., A. U. S.: We have learned much from our small group at Wakeman General Hospital with regard to the economic adjustment that will be necessary. It may be plainly stated that some of these patients, particularly the younger untrained and unmarried men, feel that the pension of $150 a month plus the $100 a month allowed for an attendant that will be paid on discharge from the Army will always be adequate to meet their needs; others are anxious to work because they need the additional income. In our small group there are 3 men who have been promised jobs by their old companies provided they are ambulatory in wheelchairs; 2 men come from families who own a business in which the soldier can be productively employed in a wheelchair. Further efforts to rehabilitate and reeducate the paraplegic is a responsibility that should be met because a reasonable percentage of them can, if rehabilitated, adequately return to gainful employment.

Domestic adjustment will be difficult. Obviously single men in this group will rarely marry unless they are picked up by some one seeking a meal ticket. Doubtless many of the married men will separate from their wives. Some of the married men who have children will not separate from their wives because of the children. In any event, this is purely a personal problem. The responsibility of a governmental agency could only go so far as to provide a man with the necessary physical reconditioning and training.

Since the subject given to me is "The Future of the Paraplegic" I may be justified in offering a plan for the care of the paralyzed soldier, based on observations with a small group of patients but a group which may well be considered a cross section of the total number of the paraplegic. It would seem pertinent to suggest that the Army create a center for the rehabilitation of the paraplegic. If an adequate number of beds could be made available and an adequate staff, it might well be that patients yet to sustain injury to the spinal cord could also be best treated during the early stages of their disability in such a center. The primary purpose, however, of a center for the rehabilitation of the paraplegic should be to accept patients after initial definitive care has been completed. One might estimate that the average stay in such a center would run from eight to twelve months. The purpose of such a center would be to complete the physical reconditioning of these men, equip them with the muscular development of the trunk and shoulder girdle so that they may become completely ambulatory in braces or wheelchair, so that they may withstand the strain of continued physical effort while seated, and to educate them so that they may become able to care for themselves in every respect; to give them vocational training suited to their ability, their past experience or to opportunities awaiting them or to give them the education and training necessary to open up for them new fields of endeavor for which they have talent or desire—fields of endeavor which in the past have not been available to them—and so to rehabilitate and reeducate them that they can return to a civilian status without being dependent the rest of their lives on institutional care, which at best does not give a person any reason or purpose for remaining alive.

Such a center should be placed in a suitable climate, one that permits outdoor activity pretty much the year round, where extremes of temperatures are not encountered.

Such a center should be housed in one story structures to permit easy access outdoors to men in wheelchairs or on crutches. The housing facilities should be fireproof unless they are all one story structures close to the ground. If a multiple story structure is used, it would of necessity require adequate elevator facilities. Such a center should be on the main line of a railroad in the community where adequate and suitable housing facilities are available for the many visitors who should come to patients of this type. The necessity for a work program might well demand that such a center be placed with reasonable proximity to industry and also somewhat removed from a locality where labor is superabundant.

Such a center would require adequate personnel, both in training and in quantity. Neurosurgeons, urologists, internists and a general surgeon would all be required in proportion to the number of beds occupied. In addition, properly trained

physical reconditioning men would be necessary, an adequate brace shop, a large physical therapy and occupational therapy department, nutrition officers and dietitians.

When one considers the vast number of questions raised by this group of patients the answers to which are unknown, it becomes obvious that such a center should have associated with it a comprehensive research program.

The key personnel referred to would necessarily be men with an interest in and an appreciation of the problem of the paraplegic. Above all, such a center would require sympathetic, imaginative and understanding direction from its commanding officer.

DISCUSSION

COLONEL ROBERT H. KENNEDY, M. C., A. U. S.: When we first received these patients, they came in rapidly and their morale was bad. Since the program was developed, the morale in the paraplegic ward is better than in any other ward in the hospital. I went on a two months mission last fall. When I left, the neurosurgical center had just been organized. On my return it had received about 600 patients and among these was a group of 39 paraplegic enlisted men and 2 officers. Their morale was bad, and it was hard to go into that ward. I went on a Christmas leave and found on my return that a young lieutenant had gone to the commanding officer a few days before Christmas and said "We've got 39 men over there in the paraplegic ward. Christmas is coming and many of these men have their families here. I don't know whether they'll be alive next Christmas but they're here this Christmas and I want every one of these men to have their families here for Christmas dinner." The first answer was "No." This ward officer was a first lieutenant who had been in the Army four months. He said "I demand that these men be allowed to have their families here for Christmas dinner. These men deserve it. They have given everything to their country. They deserve to have their families here and, damn it, they're coming to dinner." They had 140 in that ward Christmas day for dinner. The Red Cross arranged for bridge tables at each bedside, with candles, fancy table cloths, comfortable chairs. Enlisted men, Wacs and nurses from other wards volunteered to come over and help serve the dinner. It did a great deal for the hospital morale for this officer to insist on this being done. The most pleased person in the whole group was the commanding officer, who presided most graciously over the whole affair. When you need more rubber tubing, irrigating bottles or walkers and are told they cannot be obtained, there is no such answer. Every one should take the attitude that there is no such answer as "No" to their needs. The changing of personnel in the ward is the most difficult thing we have to deal with. The enlisted men, nurses and officers in charge should be left to continue in the same place. But don't forget that this is a terrific job that these people are doing and we have to caution the wardmaster and the nurses to let us know if they are feeling the strain. Some may stand it for six weeks, others six months. There has been little said about the dressing of wounds. It should be put in charge of some one person who will take an interest. The medical officer can't attend to all these cases and should make ordinary dressings the responsibility of some one nurse. I feel that patient officers sometimes do not get as good treatment as enlisted men. I believe that the officer paraplegic should be put in the paraplegic ward and see what the other men are doing. It is a big morale builder. I wonder if it would be possible to keep in the service certain men at each one of the neurosurgical centers who are paraplegic themselves, who have been kept in the service as discharged hospital patients and who can train these men and be a morale builder among them.

LIEUTENANT COLONEL THOMAS P. SHEARER, M. C., A. U. S.: There is little in the literature on the operative treatment of decubitus ulcer. At Halloran General Hospital Captain Croce, chief of general surgery, has devised a scheme for closing these ulcers by rotating full thickness grafts from adjacent areas. Our preoperative management seeks to obtain a cleanly granulating wound free from infection and sloughs with fixed edges showing signs of epithelial invasion. Some of these ulcers are 12 to 15 cm. wide and 10 to 12 cm. long. The ulcer is excised, then curvilinear incisions are made on each side both above, along the iliac crest, and below into the buttock. The large flaps so outlined are raised from the gluteal fascia. By rotating these four flaps toward the middle of the defect and approximating them to one another the defect may be completely closed with a layer of skin and normal subcutaneous pad, which thus far has seemed capable of withstanding all the abuse of the normal skin of that area. We have used a fine silk technic throughout with 000000 black silk. We have had no experience with Thiersch grafts because we have felt that the treatment as outlined is universally applicable, although some of the larger ulcers at first had to be closed in two stages. Moreover, we have felt that the end result is more durable than that of split thickness grafts applied directly over the sacrum. Some of the latter have broken down repeatedly until we covered them with sliding full thickness grafts. We have come to conclude that operative wounds in these paraplegic patients will heal fully as well as they will in other young adults whether the wound lies in an anesthetic area or not. By the simple closure of the decubitus ulcer the nursing care is greatly reduced, the patient is ready for a more advanced program and his morale is greatly elevated.

COLONEL CLAUDE BECK, M. C., A. U. S.: What we have heard in this symposium should not be regarded as the last word. We are only at the threshold in the care of these patients and I don't think we are going to stop where this symposium ends today. I should like to have a picture of what happened to the group of paralyzed patients in the last war; to see graphs on the duration of life and the causes of death; to know how many of the patients were taken care of in the veterans' hospitals and how many were able to be taken care of at home. After they arrived at their homes I should like to know what they were able to do, how much care they needed, whether any of them were able to earn a livelihood; I should like to know something about the composite picture of experiences to date in this present war. I understand that there are about 1,000 paraplegic patients in this country at the present time and that there are also additional patients abroad. We ought to have a composite picture of the course these patients have taken up to the present time. We have all been favorably impressed by the progress that has been made in the care of these patients. The picture, impressive as it is, is not as good as I would like it to be. I am disappointed in the matter of ambulation. These patients really do not get around very well. If they were to be discharged to their homes, I am doubtful whether they would get around well enough to go out on the street. Colonel Gage and I have been wondering about the advisability of bilateral amputation of the legs. Could the patient ambulate himself better if he did not have his legs? I should estimate that the legs weigh 40 to 50 pounds. With complete transection of the cord, the legs are absolutely useless in ambulation. What they actually do is to elevate the center of gravity from the ground, a distance of about 4 feet; they act like a pair of stilts and the patient is in constant fear of falling. Should we not amputate the legs? If this should be done the patient could get around much better, he would have less weight to pull after him, he could sit on a platform which has wheels under it and ambulate himself by means of his arms and he could also get around in a small motor vehicle. I am aware of the fact that we are not attracted to this idea of leg amputation because the body is mutilated by this operation and we don't like to mutilate the body. If it weren't for this aspect of the problem, I think we would all agree that amputation should be done. It does seem to me that, if any individual desires to have his legs amputated, the operation should be done and the results recorded. Captain Cameron was asked to look up the literature and he told me that he was unable to find anything on this subject.

CAPTAIN JOSEPH J. MICHAELS, M. C., A. U. S.: To the soldier with a cord lesion the reality of his disability is very obvious. There is the objective fact of his being handicapped and failing in the ability to cope with life's situations. As a result it is natural to expect a certain amount of despondency and depression, which are consistent with the reality situation. With such a great degree of disability when neurotic com-

ponents develop, it is difficult to distinguish these subjective features because the objective aspects are so obvious. In contrast to the reaction of soldiers with paralysis, the soldiers presenting scars, deformities and even amputations, although somewhat handicapped, are not as severely affected from a reality standpoint. Here a much greater degree of neurotic factors is present, so that their reality situations may be considerably distorted. During the hospitalization of these patients they are surfeited with the attentions of many individuals. The suspicion arises that, just as the patient tries to deny the seriousness of his condition and avoids facing his reality, so those who deal with him similarly may conceal from themselves the seriousness of the problem. This statement is not to dampen the ardor of optimism that has been manifested but to arouse the necessity of perhaps being somewhat more neutral and questioning what we are doing. Captain Cameron has indicated to what extent the morale of these patients rises as they find themselves learning to walk. Doubtless this is comforting to the patient and offers him something to grasp at. It is my feeling that the patient's despondency is related not only to his inability to walk but to the whole general picture of helplessness. He is unable to carry on in many spheres. It is not only an impotence in walking but the realization of a pervasive impotence in the spheres of sex, work and society. Much effort has been expended in teaching the patient how to take care of himself. However, this teaching is more in the periphery of his personality, such as taking care of his bladder, bowels, muscles, appetite, eating, talking and doing things with his hands. Such activities are of course necessary, but it is believed that if the patient came to terms with the reality of his illness and settled this problem once and for all there would even be a greater participation in his attempts at helping himself. The doctor-patient relationship mentioned by Colonel Poer might be more fully utilized by permitting the patient to unburden himself as to just how he feels about himself in his paralyzed condition. What ambitions of his have been frustrated? What kind of a world will he be returning to? Who will be able to concern themselves with him as has been the case in the hospital? To what extent can we help him overcome the psychologic dependence that will have developed because of his actual physical dependence? He will have to learn to deal with his emotions in as independent a manner as he is learning to take care of his body. In regard to Colonel Beck's provocative question of the possibility of amputating the lower extremities, one must evaluate the relative gains of such a procedure over psychologic reactions to the loss of members of the body. Would we be adding another severe psychologic trauma to the severe physical trauma already present? How will the patient react to being regarded as a cripple? How will he feel about his appearance? In the Army there is a tendency to abbreviate, make short cuts and use symbols wherever possible. The very nature of war with its emergency features may call for such terminology. However, military expediency may unwittingly bring with it certain medical disadvantages. For example, to label a soldier an "amputee" to make us overlook the fact that there is always the soldier as a person with an amputation. We regard him as an amputated individual, concentrating on the amputated part when we call him an amputee. In like manner I should like to suggest that we always remember and refer to the patient who has a spinal cord injury with a resulting paralysis primarily as a patient with paralysis and not as a paralyzed patient.

LIEUTENANT COLONEL MARVIN P. KNIGHT, M. C., A. U. S.: One of my patients, a girl, had suffered from poliomyelitis since the age of 3, with the loss of the use of both legs. At the time I saw her the entire lower leg was some 18 to 22 inches in length. She walked with crutches very well. She could swing herself on a carrier a foot higher than her buttocks. I have seen other patients—one with an amputation of one leg above the knee, the other leg amputated below the knee. He walked very well and the only time you could tell that he had a prosthesis was by watching him go up and down a stairway. Prosthetic appliances have been so developed, especially since the application of aluminum, which makes them very light, that I would venture to say that a paralyzed patient here who can walk 10 to 20 yards could walk a half mile following the application of a prosthesis correctly fitted. Of course, it is the problem of muscle transplants which have been carried out on poliomyelitis which aid a person to hold his body erect. With adequate muscle transplants from the abdomen and from the back, a patient's load would certainly be lessened following the removal of one or more extremities. The average patient can become ambulatory as long as two hinges are involved, but when a third hinge or the pelvis is encountered it is a very difficult problem.

CAPTAIN BORIS P. PETROFF: I was especially impressed by the new appliances to help patients help themselves. We have established bars in the latrines so that the men can help themselves on and off the commodes. In his paper Lieutenant Colonel Stone stated that patients were encouraged to take their own shower baths. This idea of a man taking a bath is a brand new one and we are going to try to emulate it as soon as possible. Captain Michaels has been a great help to us in the ward. We had 1 patient with complete negativism after bad news from home and only treatment by Captain Michaels snapped him out of it. Another problem is this question of sex. They can see, hear and feel and yet have no way of expressing the sex urge. Those who are married and have children are always glad to see their wives. Those who are not married and those who have no children are greatly frustrated. By certain remarks they make, the pictures they draw and the statues they make, you can see what is going on in the back of their minds. It is most important to have the neuropsychiatric service help them to adjust themselves to the outlook of the future without sex life.

Postmortem Findings in Six Cases of Traumatic Transverse Lesions of the Spinal Cord

CAPTAIN HENRY RAPPAPORT, M. C., A. U. S.: This is a report of 6 cases at Nichols General Hospital in which death occurred from complications of transverse lesions of the spinal cord. In 5 instances the fatal condition developed as a complication of the genitourinary tract infection, in the sixth from a complication of a deep sacral decubital ulcer.

Although these cases vary considerably as to their pathologic manifestations they have the following features in common: (1) the extreme emaciation at the time of death, (2) the severe secondary anemia and (3) a type of inflammation spreading by direct extension without respect for anatomic barriers such as fascias, periosteum, serosal membranes or capsules of visceral organs.

The type of inflammation found suggests strongly a pronounced decrease of the general and local resistance to infection. This lack of resistance is further evidenced by the type of organisms found in 3 of the cases in which pure cultures of gram negative bacilli were recovered from the postmortem blood. The same organisms were also found in the local lesions. In spite of the usual low pathogenicity of the organisms of the coli-aerogenes group they were apparently able to cause continued suppuration and septicemia in these debilitated patients. It has been shown that resistance to infection is considerably decreased in hypoproteinemia and that, once infection develops, the regeneration of blood protein is much more difficult. It is therefore suggested that the type of inflammation found in these hypoproteinemic patients was largely due to such lack of resistance, particularly lack of local tissue resistance. According to a recent publication the loss of tissue protein is much more severe than is indicated by the low plasma protein; the reduction to 1 Gm. in the circulating plasma is equivalent to a loss of 30 Gm. of body protein (Elman and others). It is suggested that the severe protein depletion of the tissues might account for their decreased resistance to infection. In all our cases anorexia developed sometime during the course of the disease, and the food intake was inadequate.

Although the number of cases presented is small, it seems to afford further evidence that there is a causal relationship between the degree of protein deficiency and the extent and severity of the inflammatory process. A vicious cycle is established whereby hypoproteinemia decreases resistance to infection, and, once infection develops, the regeneration of body proteins becomes more difficult.

Current Medical Literature

AMERICAN

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Titles marked with an asterisk (*) are abstracted below.

American Journal of Psychiatry, New York

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Spain as Cradle of Psychiatry. P. Bassoe.—p. 731.
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Medical View of Menopause. T. Owen.—p. 756.
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Developmental Roots of Schizophrenia. J. S. Kasanin.—p. 770.
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*Spontaneous Convulsions Following Convulsive Shock Therapy. B. L. Pacella and S. E. Barrera.—p. 783.
Use of Demerol in Artificial Fever. T. J. Heldt, N. P. Dallis and W. J. O'Connell.—p. 789.
Psychiatric Internship. G. B. Pearson and Kathryn L. Schultz.—p. 793.
Clinical and Electrophysiologic Observations Following Electroshock. L. D. Proctor and John E. Goodwin.—p. 797.
Correlation of Results of Sodium Amytal Narcosis and of Convulsive Shock Treatment. R. A Clark, R. H. Kiefer and M. J. Gerson.—p. 801.
Conditioned Aversion Treatment in Chronic Alcoholism: Preliminary Report of 100 Cases. J. V. Edlin, R. H. Johnson, P. Hletko and G. Heilbrunn.—p. 806.
Psychotic Profiles and Sex Profiles Shown by Test Battery. L. S. Penrose.—p. 810.
Freudianism and Psychoanalytic Tradition. J. Wortis.—p. 814.
*Electronarcosis Therapy in Schizophrenia. Esther B. Tietz, G. N. Thompson, A. Van Harreveld and C. A. G. Wiersma.—p. 821.
Psychiatric Observations in Combat Area in South Pacific. J. M. Henninger.—p. 824.

Prefrontal Lobotomy in Schizophrenia.—Freeman and Watts maintain that schizophrenic patients are the most difficult to relieve by prefrontal lobotomy. The problem is much simpler with anxiety states, involutional depressions and obsessive tension states. Prefrontal lobotomy in schizophrenia is often unsuccessful when carried out as far forward as the plane of the coronal suture. The thinking patterns persist, and there is still enough of an emotional component to dominate the behavior. A lobotomy far enough posterior to the plane of the coronal suture to bring about such symptoms as reflex grasping and groping, with transitory Babinski sign and prolonged incontinence, will usually succeed in abolishing the emotional charge attached to the abnormal ideas, although at the expense of severe disability in the social adjustment. Every millimeter the subcortical incisions are placed posterior to the coronal suture prolongs the patient's convalescence. The authors are inclined to undertake prefrontal lobotomy in a chronic schizophrenic patient with the expectation of eventually performing a radical operation. If there is relatively good preservation of socially acceptable habits, they are inclined to incise the frontal white matter in the plane of the coronal suture, but with the understanding that a more extensive operation may have to be undertaken should the patient's condition remain unchanged. The authors have observed 50 schizophrenic patients over a period of two to seven years following prefrontal lobotomy. Slightly more than half of the patients are usefully occupied and less than 1 in 5 is institutionalized. While some chronic patients cannot be discharged from hospitals, their care is greatly simplified because of their new objective outlook on life and pleasure in living. Prefrontal lobotomy is the procedure of last resort. This does not mean, however, that it should be delayed until emotional deterioration is well advanced.

Spontaneous Convulsions Following Electric Shock Therapy.—Pacella and Barrera say that of over 500 patients who received electric convulsive therapy 2 exhibited spontaneous generalized convulsions six and one half to eight weeks after termination of treatment. These 2 patients had never had seizures prior to treatment, nor were there epileptic manifestations in any of the family members. In both instances the brain wave tracings were abnormal prior to shock. It is concluded that spontaneous convulsions following convulsive therapy are prone to occur only in those patients who have latent convulsive tendencies as revealed by electroencephalograms. The suggestion is made that preshock electroencephalograms are particularly indicated for patients who give histories of previous convulsions in childhood or later life or who have family members exhibiting epileptic manifestations.

Electronarcosis in Schizophrenia.—Tietz and her associates say that a means to increase the benefit obtained by electroshock was sought in electronarcosis, which has been studied in experimental animals for the last forty years. This is a method of prolonged application of the electric current to the brain, causing a controlled state of unconsciousness preceded by a modified convulsion. Much preliminary work was carried out on animals before adapting electronarcosis to human subjects; more than 100 electronarcoses were induced in 9 patients without serious complications, and it was concluded that the method is without danger when cautiously applied. The present study is an evaluation of electronarcosis based on the treatment of 47 cases of schizophrenia. Over 1,000 treatments have been given without fatality or significant complications. The therapeutic effects of electronarcosis in a group of schizophrenic patients were superior to those expected of electroshock treatment and about the same as results expected from insulin shock therapy.

American Journal of Public Health, New York

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Sickness as Index of Need for Health Supervision of School Child. J. Downes.—p. 593.
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*Active Immunization with Purified Somatic Antigens of Eberthella Typhosa, Salmonella Paratyphi and Salmonella Schottmuelleri. H. R. Morgan.—p. 614.
Is Dermatophytosis a Significant Occupational Health Problem? S. M. Peck and L. Schwartz.—p. 621.
Relationship of U. S. Public Health Service to State and Local Health Units. E. S. Tisdale.—p. 625.
Tips and Tricks for Practice. S. Zimand.—p. 631.

Active Immunization with Purified Somatic Antigens of Enteric Organisms.—Using an alcoholic precipitation technic, Morgan obtained a purified antigen from cultures of Eberthella typhosa which had been grown in synthetic medium, thereby avoiding contaminating materials which might have been derived from the usual complex culture substrates. The antigen produces a good immunogenic response in man in subcutaneous doses, although it is highly toxic for human beings when injected intravenously. Morgan made a comparative study of the purified somatic antigens of other organisms of this group and of triple typhoid (T. A. B.) bacterial vaccine for human immunization. He found that purified antigens prepared from E. typhosa, Salmonella paratyphi and Salmonella schottmuelleri cultivated in synthetic mediums produced less local and constitutional reactions than a triple typhoid bacterial vaccine when injected subcutaneously in man. Purified somatic antigens in

total dosage of 0.12 mg. for E. typhosa, 0.048 mg. for S. paratyphi and 0.048 for S. schottmuelleri produced higher titers of mouse protective antibody than did 2.5 cc. of a standard triple typhoid bacterial vaccine. These purified antigens possess the advantages of potency, stability and compactness.

Archives of Dermatology and Syphilology, Chicago

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Low Potassium Diet in Treatment of Psoriasis. E. B. LeWinn and E. Urbach.—p. 398.
Cutaneous Reaction of Persons with Atopic Eczema to Human Dander: Result of Patch Tests on Scarified Skin. F. A. Simon.—p. 402.

Cutaneous Detergents.—Analysis of a survey of several thousand persons in various occupations disclosed that over 34 per cent believed that soap caused dryness, scaling, itching or burning or some combination of these symptoms. Guild states that soap and a variety of substitutes for soap do not fulfil all the qualifications of a desirable cutaneous detergent. Most of the available synthetic detergents are true sulfates and contain the hydrolyzable acid sulfate radical. Hence they release small quantities of sulfuric acid. This may be a contributing cause of the irritation produced by these sulfated compounds. Most of these synthetic agents contain sulfur joined directly to the oxygen atom and that, in turn, to a carbon atom, chemically represented at R-O-SO_2-OH. An ether sulfonate, however, contains the sulfur joined directly to a carbon atom, R-SO_2-OH. The latter compound cannot hydrolyze to produce sulfuric acid, as the bond R-S is extremely strong. A detergent cream composed of petrolatum, wool fat cholesterols, lactic acid and a sulfonated ether has been used for five years in private practice and in clinics of the Massachusetts General Hospital. The detergent lowers surface tension of water considerably more than does soap and is an active emulsifier of all types of oil. These properties make the cream about 40 per cent more active than soap. It is more rapid in action than soap and requires less water and less friction to produce suds. The cream, as well as the suds it generates, has a p_H value of 5.5, which corresponds to that of the average normal skin. The cream is active under acid, alkaline and neutral conditions and when used with either hard or soft, cold or hot water. When used with sea water it is a good detergent and produces suds. The preparation is no more toxic than soap would be if accidentally ingested.

Archives of Otolaryngology, Chicago

41:395-470 (June) 1945

*Analysis of Colds in Industry. J. H. Kler.—p. 395.
*Penicillin and Primary Suture in Treatment of Acute Surgical Mastoiditis. L. F. Johnson, L. Weinstein and P. S. Spence Jr.—p. 408.
Practice of Otorhinolaryngology in Army General Hospital. I. J. Hauser.—p. 413.
Bárány and Galvanic Tests: Their Value in Diagnosis of Labyrinthine and Intracranial Disease in Presence of Suppurative Otitis Media. B. Rachlis.—p. 422.
Transpalatine Operation for Congenital Atresia of Choanae in Small Child or Infant. L. W. Ruddy.—p. 432.
Anesthesia for Tonsillectomy Induced by Intravenous Administration of Pentothal Sodium. S. L. Fox and S. Rochberg.—p. 439.
Unusual Foreign Body of Nose. V. S. Steele and E. C. Dow.—p. 441.
Progress in Otolaryngology: Summaries of Bibliographic Material Available in Field of Otolaryngology. Survey of Literature on Tuberculosis, 1940-1943. G. E. Wilson, assisted by W. K. Stern.—p. 442.

Colds in Industry.—Colds are responsible for more than one third of the total number of days lost in American industry. They cause a loss of 100 million working days each year. There is a definite pattern to the incidence of colds, with the highest peak in December (or December-January) and a lesser peak in October. July is the month of the lowest incidence of colds. Sudden drops in temperature are followed by rises in the incidence and in the severity of colds. Both incidence and severity are much greater among office workers than among factory workers and greater among women than among men. A majority of the colds in women appeared at the time of the menstrual period. There is decreasing incidence of colds with increasing age. The severity of colds increases with age. There are fewer colds in air conditioned plants. The incidence of colds is highest in drafty places. More colds start on Monday than on any other day of the week. This is especially true of colds among men. Posture is an important factor in that the incidence and the severity of colds are lowest among those whose work necessitates walking about most of the time. Early therapy seems to be of greatest value.

Penicillin and Primary Suture in Acute Surgical Mastoiditis.—Johnson and his associates report their experience in treating 23 patients with acute surgical mastoiditis by primary closure of the wound and instillation of penicillin into the mastoid cavity. Seventeen patients showed complete cure after one course of treatment, while 6 remained well after a second course of penicillin. The recommended dose of the drug is 10,000 units every eight hours for four days (a total of 120,000 units). Local application of penicillin in the mastoid cavity through a ureteral catheter after mastoidectomy appears to be a feasible and practical procedure. When this drug is given in proper dosage, healing of the postaural wound and a dry external auditory canal usually are present on the fifth postoperative day. In cases in which aural discharge recurs, reinsertion of the catheter and reinjection of penicillin for an appropriate period of time produce complete clearing of the discharge. Local treatment with penicillin seems preferable to the use of sulfonamide compounds for infections with Staphylococcus aureus, hemolytic streptococci and other organisms susceptible to the antibiotic agent because of the absence of any harmful toxic effects, the slight risk of sensitization and the increased speed of healing.

Arizona Medicine, Phoenix

2:139-208 (May) 1945

Looking at Medicine. C. P. Austin.—p. 159.
Castless Ambulatory Treatment of Fractures: Report of 23 Applications of Roger Anderson Skeletal Fixation Appliance. M. Cohen.—p. 162.
Early Care of Concomitant Monocular Strabismus. V. A. Toland.—p. 166.
Relation of Doctor to Hospital. E. F. Boyd.—p. 167.
American Medicine Tomorrow. M. F. Cahal.—p. 171.

Canadian Medical Association Journal, Montreal

52:543-656 (June) 1945

Pathology and Treatment of War Wounds. F. G. Kergin.—p. 543.
Penicillin Creams. P. Greey and H. D. Hebb.—p. 550.
*Observations on Salicylate Therapy in Rheumatic Fever. J. D. Keith and A. Ross.—p. 554.
*Prevention of Acute Rheumatic Fever. C. W. Fullerton.—p. 559.
Management of Preeclampsia. N. J. Eastman and P. P. Steptoe.—p. 562.
*Use of Penicillin in Ludwig's Angina. D. M. Bean and W. C. MacKenzie.—p. 568.
Studies Concerning Effects of Various Hormones on Renal Structure. H. Selye, Helen Stone, K. Nielsen and C. P. Leblond.—p. 571.
Present Status of Internal Fixation of Fractures. A. L. Murphy.—p. 582.
Transplantation of Peritoneum in Treatment of Direct Inguinal Hernia. A. M. Vineberg.—p. 587.
Anthrax: Its Incidence and Therapy, with Report of Case. A. F. Perl.—p. 592.
Exomphalos. S. S. Peikoff.—p. 600.
Simple Test for Acetone in Urine. I. M. Rabinowitch.—p. 602.
Ménière's Disease, with Some Observations on Its Treatment by Histamine. A. A. Campbell.—p. 605.
Venereal Disease: Hidden Hazard in Industry. L. P. Ereaux.—p. 606.

Salicylate Therapy in Rheumatic Fever.—Keith and Ross say that during the winter and early summer of 1944 an epidemic of streptococcic infection was prevalent among naval personnel. Cases of rheumatic fever appeared in the wake of this epidemic. Between February and the end of July 121 cases were admitted to the hospital with definite rheumatic fever. Of the 103 cases in the salicylate study, 70 were treated with a daily dose of 10 to 13.3 Gm. (150 to 200 grains) of sodium salicylate or acetylsalicylic acid. The drug was started on admission to the hospital and was given in five daily doses.

Each dose was accompanied with an equal quantity of sodium bicarbonate. In the control group of 33 cases 0 to 2 Gm. of salicylates was given daily. The salicylates were usually kept up for two to four weeks after the sedimentation rate was normal. Plasma salicylate levels were determined on a limited group. Oral administration of 13.3 Gm. (200 grains) of sodium salicylate with an equal quantity of sodium bicarbonate produced an average blood level of 31 mg. per hundred cubic centimeters. Ten Gm. (150 grains) of sodium salicylate with sodium bicarbonate produced a blood level averaging 27 mg. per hundred cubic centimeters. Such levels are sufficient to control joint symptoms, keep the temperature down and reduce the pulse rate. The sedimentation rate returned to normal in an average of four weeks. The incidence of heart disease was approximately the same in the high salicylate group as in the low salicylate group. Ten per cent of the rheumatic patients who entered the hospital with normal hearts developed rheumatic heart disease. Nausea, vomiting and tinnitus are much more common early in the administration of salicylates than after the patient has been receiving the drug for several days. These symptoms are not usually sufficient cause for stopping treatment. There was no evidence of kidney damage in this series.

Prevention of Acute Rheumatic Fever.—Fullerton says that in the city of New York in 1938 there were 1,105 reported deaths from rheumatic fever and rheumatic heart disease, whereas from six other common childhood diseases, namely whooping cough, diphtheria, measles, scarlet fever, cerebrospinal fever and infantile paralysis, there were only 247 deaths reported. There were five times as many deaths from rheumatic fever as from a combination of the six common childhood diseases. With the advent of the sulfonamides a practical method for the prevention of hemolytic streptococcic infections presented itself. Numerous investigators have administered since 1936 daily doses of sulfanilamide and latterly sulfadiazine to patients who had rheumatic fever. In the eight year period 815 rheumatic patients have been given this therapy, and only 8, or less than 1 per cent, have developed rheumatic fever, while the incidence among control groups ranged from 10 to 35 per cent. The value of this prophylactic measure has received tremendous impetus by its adoption and wholesale use in the U. S. Navy. In the latter part of the winter of 1943, 250,000 men were placed on daily doses of 0.5 Gm. of sulfadiazine twice daily, while another quarter of a millon men were used as controls. During this period hospitalization for severe respiratory diseases was reduced 80 to 90 per cent, streptococcic infections were reduced 85 per cent and the incidence of acute rheumatic fever dropped so that for every 14 cases in the control group there was only 1 case in the treated group. The greatest hope in the prevention lies in the adequate and prolonged prophylactic use of salicylates during a rheumatic attack, to be followed immediately by prolonged prophylactic use of sulfadiazine.

Penicillin in Ludwig's Angina.—Bean and MacKenzie have treated Ludwig's angina with penicillin since 1944. At all times they have a tracheotomy set available, so that, if no improvement was noted in the first twenty-four hours, or if the progress of the disease warrants it, they are prepared to carry out surgical drainage without delay. Early surgery has not been necessary in the cases treated so far. Penicillin will control the infection in the early stages of Ludwig's angina in a high percentage of cases and will greatly reduce the number requiring early surgery.

Journal-Lancet, Minneapolis

65:211-234 (June) 1945

Symposium on Obstetrics: Introduction. R. E. Leigh.—p. 211.
Placenta Previa. E. M. Ransom.—p. 212.
Abruptio Placentae. B. Urenn.—p. 215.
Diagnosis and Treatment of Ectopic Pregnancy. W. A. Liebeler.—p. 218.
Treatment of Deafness, Ear Noises and Dizziness by Hypothermic Therapy. S. Quisling.—p. 219.
Low Back Pain in Army Specialized Training Program. L. J. Stark.—p. 223.
Spurious Fitness by Endurance Test. H. R. McPhee and P. V. Wells.—p. 226.
Ringworm of Scalp: Tinea Capitis. F. W. Lynch.—p. 228.

Journal of Nervous and Mental Diseases, New York

101:515-640 (June) 1945

Neurologic Complications Following Use of Typhoid Vaccine. W. G. Peacher and R. C. L. Robertson.—p. 515.
Physiochemical Mechanisms in Experimental Epilepsy. V. H. Cicardo.—p. 527.
Treatment of Epileptic Patients with a Combination of 3-Methyl 5,5 Phenylethyl-Hydantoin and Phenobarbital: Preliminary Report. A. E. Loscalzo.—p. 537.
Psychopathic Behavior with Latent Epilepsy. N. Q. Brill and E. F. Walker.—p. 545.
Delayed Favorable Effects in Psychotherapy. J. C. Yaskin.—p. 550.
Nightmares of Suffocation. N. Fodor.—p. 557.
Functional Symptoms as First Evidence of Pancreatic Disease. N. K. Rickles.—p. 566.
Cephalin-Cholesterol Flocculation Test in Catatonic and Other Schizophrenics. H. de Jong and J. Harold St. John.—p. 572.
Tubercle Bacilli in Spinal Fluid of Dementia Precox. E. Loewenstein.—p. 576.
Observations of Multiple Joint Pains in the Extremities at 38,000 feet. E. V. Bridge, F. M. Henry and J. H. Lawrence.—p. 583.
"Vibration Sense" as Differential Diagnostic Sign in Doubtful Cases of Parkinson Syndrome. A. Gordon.—p. 589.

Journal of Pediatrics, St. Louis

26:509-598 (June) 1945

*Congenital Alkalosis with Diarrhea. J. L. Gamble, Kathleen R. Fahey, Janet Appleton and Elsie MacLachlan.—p. 509.
*Congenital Alkalosis with Diarrhea. D. C. Darrow.—p. 519.
Persisting Liver Damage Following Catarrhal Jaundice. G. W. Salmon and Ellen E. Richman.—p. 533.
Hospital Morbidity and Mortality of Infantile Eczema: Report of 100 Consecutive Hospitalized Cases of Infantile Eczema Without Deaths. S. Epstein.—p. 541.
Serum in Prophylaxis of Contacts and Treatment of Whooping Cough. J. H. Lapin.—p. 555.
Psychiatric Evaluation of Hyperkinetic Child. W. F. Schneider.—p. 559.
Simple Device for Timing Precordial Murmurs. M. M. Maliner.—p. 570.
Mechanical Suffocation During Infancy: Comment on Its Relation to Total Problem of Sudden Death. P. V. Woolley Jr.—p. 572.
Treatment of Rheumatic Fever with Penicillin. L. A. Rantz, W. W. Spink, P. Boisvert and H. Coggeshall.—p. 576.
Penicillin Treatment of Oral Inflammations in Childhood. M. B. Marks.—p. 582.
Acute Poliomyelitis and Acute Infectious Lymphocytosis: Their Apparent Simultaneous Occurrence in Summer Camp. J. S. Beloff and K. M. Gang.—p. 586.

Congenital Alkalosis with Diarrhea.—Severe diarrhea causes wastage of all the gastrointestinal secretions. The secretions which enter the intestine contain more of sodium than of chloride, and their total volume is several times larger than the volume of gastric juice. Diarrheal stools contain a larger quantity of sodium than of chloride. Diarrhea would not be expected to cause recession of chloride in the plasma with resulting alkalosis. Actually, in severe diarrheal disease, unless vomiting is a prominent feature, reaction change in extracellular fluid has been found to be in the direction of acidosis. Gamble and his associates report the case of an infant who disobeyed these simple and apparently axiomatic rules for diarrheal disease. He was 14 months of age when he entered the hospital. His affliction was a voluminous watery diarrhea which began directly after birth and had steadily continued. There was no evidence of impairment of gastric function. A large intake of milk supplemented by various other suitable articles of food was accepted without vomiting. Measurements of plasma chloride revealed persistently low values. The bicarbonate concentration was greatly extended beyond its normal value, and plasma p_H was increased. Observations on this infant indicate, but do not identify, an intrinsic defect in the control of electrolyte distribution in the body fluids.

Congenital Alkalosis with Diarrhea.—Darrow reports a case which is almost identical with that described by Gamble. The patient showed intractable watery diarrhea from birth to the age of 2 years 11 months. The stools were acid, contained considerable amounts of sodium, of chloride and at times of potassium. The alkaline urine contained no chloride, little sodium and variable amounts of potassium. Stool chloride was always greater than stool sodium and stool water greater than urine water. Absorption of nitrogen, fat, carbohydrate, phosphorus and calcium was essentially normal. The boy grew slowly and was subject to frequent exacerbations of the diarrhea accompanied by signs and symptoms of dehydration. The blood serum showed extreme alkalosis. Occasionally, serum potassium was low but usually was normal. Usually no signs of tetany

were present, but tetanic convulsions occurred once and carpopedal spasm occasionally. Metabolic data show that as chloride is lost more rapidly than sodium, extracellular sodium is transferred into intracellular fluids and approximately equivalent amounts of potassium are released from the cells and excreted. Similarly, when dehydration is treated with sodium chloride and potassium chloride, insufficient sodium is retained to account for the expansion of extracellular chloride but retention of potassium accounts for the release of sufficient sodium from cells to replace the deficit of extracellular sodium and to explain the changes in concentration of extracellular electrolytes. Darrow shows that the only striking difference between his observations and those of Gamble are the increased volume of stools which Gamble found when sodium chloride was added to the food. It is probable that Gamble's patient suffered at all times from a variable degree of potassium deficit. It seems likely that correction of severe alkalosis by administration of sodium chloride cannot be entirely successful as long as a deficit of potassium persists. Such a hypothesis may account for the difference in reaction of the 2 cases to treatment with sodium chloride.

Journal of Pharmacology & Exper. Therap., Baltimore

83:235-306 (April) 1945

Mode of Action of Three New Diuretics: Melamine, Adenine and Formoguanamine. W. L. Lipschitz and E. Stokey.—p. 235.
Studies on Shock Induced by Hemorrhage: XI. Method for Accurate Control of Blood Pressure. P. D. Lamson and W. E. DeTurk.—p. 250.
Comparative Pharmacologic Action of Some Phenyl-, Cyclohexyl- and Cyclopentyl- Alkylamines. A. M. Lands, J. R. Lewis and V. Loraine Nash.—p. 253.
Effect of Hepatotoxic Alkaloids on Prothrombin Time of Rats. C. L. Rose, R. D. Fink, P. N. Harris and K. K. Chen.—p. 265.
*Thiouracil Levels in Serum and Urine. K. E. Paschkis, A. Cantarow, A. E. Rakoff and E. K. Tillson.—p. 270.
Metabolism, Toxicity and Manner of Action of Gold Compounds in Treatment of Arthritis: VII. Effect of Various Gold Compounds on Oxygen Consumption of Rat Tissues. W. D. Block and Elizabeth L. Knapp.—p. 275.
Renal Clearance of Sulfamerazine, Sulfadiazine, Sulfathiazole and Sulfapyridine in Man. J. G. Reinhold, H. F. Flippin, A. H. Domm, J. J. Zimmerman and L. Schwartz.—p. 279.
Studies on Antimalarial Drugs: Distribution of Atabrine in Tissues of Fowl and Rabbit. Frances K. Oldham and F. E. Kelsey.—p. 288.
Studies on Pain: Effects of Analgesic Agents on Sensations Other than Pain. A. Wikler, Helen Goodell and H. G. Wolff.—p. 294.

Thiouracil Levels in Serum and Urine.—Paschkis and his co-workers studied the concentration of thiouracil in the blood and excretion in the urine following its administration in therapeutic doses to human subjects. They found a modification of Chesley's procedure for determination of thiourea more satisfactory for thiouracil than methods previously described. When administered orally, thiouracil is absorbed rapidly and is excreted in the urine rapidly. Absorption from the rectum is relatively poor and apparently inadequate for therapeutic purposes. Thiouracil is present in the erythrocytes and plasma in approximately the same concentration. It can be removed from the serum by dialysis and is therefore either in a free state or only loosely bound to protein. A more constant level is maintained when small quantities are given at frequent intervals during the day than when a single large dose is administered. Unless a large dose is given in the evening, the concentration falls during the night to practically imperceptible levels in the morning.

Kansas Medical Society Journal, Topeka

46:145-178 (May) 1945

Cancer in Kansas. F. C. Beelman.—p. 145.
Treatment for Sacroiliac Strain or Sprain, Torticollis and Lumbago. M. Shoyer.—p. 149.

46:181-216 (June) 1945

Cesarean Section in Private Practice. F. J. Nash.—p. 181.
Transfusion of Whole Blood. C. Wilson.—p. 186.

Kentucky Medical Journal, Bowling Green

43:119-150 (May) 1945

Postwar Planning for Physicians. R. I. Lee.—p. 127.
Venous Thrombosis. G. de Takats.—p. 130.
Abdominal Symptoms Not Due to Abdominal Disease. W. H. Witt.—p. 137.
Roentgen Therapy in Inflammatory and Allied Conditions. J. E. Singer.—p. 142.

Nebraska State Medical Journal, Lincoln

30:189-224 (June) 1945

Role of Radiotherapy in Treatment of Malignant Neoplasms. H. B. Hunt.—p. 192.
Experience with Beck Two Flap Low Transperitoneal Cesarean Section. C. F. Moon.—p. 197.
Treatment of Hypertension with Potassium Thiocyanate. C. Frandsen.—p. 199.
Urinary Disturbances in the Aged. T. D. Boler.—p. 202.
Acute Urinary Extravasation: Urologic Emergency. L. W. Lee, E. Davis and G. D. Shoup.—p. 204.
Convulsions in Infancy and Childhood. G. C. O'Neil.—p. 207.
Mass X-Ray Survey for Pulmonary Tuberculosis in Nebraska. L. E. Kling.—p. 211.

30:225-264 (July) 1945

Place of Radioactive Substances in Treatment of Disease. R. W. Fouts.—p. 230.
X-Ray Treatment of Inflammations and Acute Infections. F. L. Simonds.—p. 233.
Congenital Microcolon Associated with Multiple Small Intestine Stenoses and Atresias. H. A. McConahay.—p. 237.

Northwest Medicine, Seattle

44:171-200 (June) 1945

Tuberculosis Control in State of Washington. C. Northrup.—p. 174.
Phlebography and Treatment of Venous Thrombosis. F. M. Anderson and R. H. Patterson.—p. 178.
Chest Pain and Heart Disease. T. H. Duerfeldt.—p. 187.

44:201-232 (July) 1945

Problem of Vitamin A Requirement of Man. J. V. Straumfjord.—p. 204.
New Anticonvulsant in Treatment of Epilepsy: 3-Methyl 5.5-Phenylaethylhydantoin (Hydantal): Preliminary Report. N. W. Clein.—p. 210.
Aspects of Nasal Cosmetic Surgery. C. Firestone.—p. 213.
Acute Pelvic Pain. G. Kunz Jr.—p. 216.
Medical Aspects of Search and Rescue Proceedings. F. L. Fletcher.—p. 220.
*Rubella Cataract: Congenital Cataract and Other Defects Following German Measles During Pregnancy of Mother. A. F. M. DeRoetth and P. B. Greene.—p. 222.

Rubella Cataract.—DeRoetth and Greene report 2 cases of congenital cataract in infants. In addition, 1 baby had microcephaly and microphthalmos and the other had a congenital heart lesion. The authors think that the cataracts should be extracted. The Australian committee pointed out that avian and mammalian embryonic tissues are more susceptible to infection than the adult tissues. This is the basis of Goodpasture's virus culture technic. The human embryo possibly possesses the same susceptibility to infection. The virus of German measles may pass the chorionic villi more readily than bacteria before a placental barrier has been developed. The Australian committee made the following suggestions: Expose all young girls to rubella; try to isolate the virus and prepare a vaccine against the disease; study the effect of convalescent serum to be used on the pregnant mother in case she had no rubella before. The question comes up whether therapeutic abortion is indicated if the disease is contracted in the first three months of pregnancy.

Public Health Reports, Washington, D. C.

60:693-724 (June 22) 1945

Physical Impairments of Members of Low Income Farm Families, 11,490 Persons in 2,477 Farm Security Administration Borrower Families, 1940: IV. Defective Tonsils and Adenoids. Mary Gover and J. B. Yaukey.—p. 693.
*Studies on Susceptibility to Poliomyelitis. C. Armstrong and D. J. Davis.—p. 710.

60:725-752 (June 29) 1945

Immunization of White Rats Against Infections with Pasteurella Tularensis. C. L. Larson.—p. 725.
Studies of Acute Diarrheal Diseases: XVI. Outbreak of Salmonella Typhi Murium Infection Among Newborn Premature Infants. J. Watt and Elizabeth Carlton.—p. 734.

Susceptibility to Poliomyelitis.—Persons exposed to poliomyelitis may react quite differently, some developing constitutional symptoms with paralysis while others harbor the virus but show no symptoms. The cause for this difference is unknown, as is the actual reason for the common occurrence of virus neutralizing antibodies in serums collected from the general population. Approximately 70 per cent of poliomyelitis patients develop antibodies slowly, if at all, following a recognizable attack. If this is an inherited characteristic, it is pos-

sible that the fathers and mothers of patients with the paralytic form of poliomyelitis might be found to show a higher incidence of non-neutralizing serums than would persons of corresponding age from the general population. The serums for a determination of this point were collected from 42 mothers and 27 fathers of hospitalized paralytic poliomyelitis patients in North Carolina during the 1944 outbreak. When tested with the Lansing strain of poliomyelitis virus in white mice, the serums from 39 mothers neutralized the virus, 3 partially neutralized it and none were negative. Among serums from 27 fathers, 23 neutralized it, 3 partially neutralized it and 1 was negative. These results give no indication that paralytic poliomyelitis is more apt to occur among those whose parents do not readily produce circulating antibodies against the virus.

Radiology, Syracuse, N. Y.

44:531-592 (June) 1945

Antral Gastritis: Roentgenologic and Gastroscopic Findings. W. W. Vaughan.—p. 531.
Roentgen Appearance of Lobar and Segmental Collapse of Lung: II. Normal Chest as It Pertains to Collapse. L. L. Robbins and C. H. Hale.—p. 543.
Fibrous Dysplasia of Skull: Probable Explanation for Leontiasis Ossea. D. G. Pugh.—p. 548.
Radiation Therapy of Carcinoma of Thyroid. R. Rosh and L. Raider. —p. 556.
Further Problems in X-Ray Protection: I. Radiation Hazards in Photofluorography. M. I. Birnkrant and P. S. Henshaw.—p. 565.
Further Problems in X-Ray Protection: II. Irradiation Injury and the Tolerance Dose. P. S. Henshaw.—p. 569.
Further Problems in X-Ray Protection: III. Protective Measures in Photofluorography. M. I. Birnkrant and P. S. Henshaw.—p. 581.
Teratoid Tumor of Chest: Case Report. D. S. Dann, I. H. Lockwood, H. A. Neibling and J. W. Walker.—p. 585.
Neurofibroma of the Cauda Equina: Report of Case. R. Pomeranz. —p. 588.

Surgery, Gynecology and Obstetrics, Chicago

81:1-112 (July) 1945

Primary Resection (Close Anastomosis) of Rectal Ampulla for Malignancy with Preservation of Sphincteric Function, Together with Further Account of Primary Resection of Colon and Rectosigmoid and Note on Excision of Hepatic Metastases. O. H. Wangensteen. —p. 1.
Metabolic Alterations Following Thermal Burns: II. Changes in Plasma Volume and Plasma Protein in Convalescent Phase. W. E. Abbott, J. W. Hirschfeld and F. L. Meyer.—p. 25.
*Routine Use of Protein Digest Intravenously Following Major Surgical Procedures. H. H. Davis.—p. 31.
*Disarticulation of Innominate Bone for Malignant Tumors of Pelvic Parietes and Upper Thigh. E. D. Sugarbaker and L. V. Ackerman. —p. 36.
Parachute Fractures. P. A. Knepper.—p. 53.
Wounds of Rectum. C. N. Morgan.—p. 56.
Concussion of Spinal Cord: Experimental Study and Critique of Use of Term. R. A. Groat, W. A. Rambach Jr. and W. F. Windle.—p. 63.
Immediate Skin Grafting Following Injuries. M. K. King.—p. 75.
*Dicumarol Therapy in Postoperative Thrombophlebitis and Phlebothrombosis. W. H. Parsons.—p. 79.
Effect of Dihydrotachysterol on Certain Toxemias of Late Pregnancy. W. Shute and E. Shute.—p. 83.
"Early Rising," Following Major Surgical Operations. P. W. Schafer and L. R. Dragstedt.—p. 93.

Use of Protein Digest Intravenously Following Surgical Procedures.—Davis reviews observations on the use of protein digest (amigen) in 203 surgical patients. At two hospitals amigen was given intravenously to most of the patients until they were able to take a soft diet by mouth. In another hospital Davis used no amigen but glucose and isotonic solution of sodium chloride as a control. In four groups of patients the favorable results of protein digest intravenously were especially noticeable, because a longer time elapsed before the patients were able to resume eating. They were given 1 liter of amigen twice a day until it was safe to begin mouth feedings. They maintained their strength and well being, and they did not develop edema. There was no need to give food by mouth until peritonitis had subsided and until bowel resections had quite healed. These four groups of patients included those with peritonitis, intestinal obstruction and gastric resections and those who had undergone colostomy mainly for carcinoma. The author advocates the intravenous use of protein digest following major surgery as a routine measure until such time as patients are able to take adequate nourishment by mouth.

Disarticulation of the Innominate Bone for Malignant Tumors.—Sugarbaker and Ackerman state that 99 patients have been operated on for tumors of bone or soft parts in the region of the upper femur or pelvis. Although an overall mortality of 28 per cent exists, that of the first forty year period was 56 per cent but during the past ten years it has dropped to 14 per cent. This drop has been largely due to improvement in the treatment of shock, which has been the primary complication of this operation. Of 45 patients surviving operation and followed for from one to five or more years, 21 remained clinically well and 24 died. The deformity, although considerable, is borne gratefully by these patients, who have become convinced that there remains no hope of cure. Far too few patients have received the benefit of radical operation. Advantages of wide resection have not been sufficiently exploited, particularly as regards partial or incomplete removal of the innominate bone when that bone itself represents the site of the tumor. With more adequate control of the mortality, patients will be selected less on the basis of age and more on the basis of the pathology of the tumor. Consideration of these factors will favorably influence the prognosis in sarcomas of the upper thigh and pelvic parietes.

Dicumarol in Postoperative Thrombophlebitis and Phlebothrombosis.—In probably 95 per cent of all cases postoperative pulmonary emboli which terminate fatally have their origin in thrombosis of the veins of the lower extremities. Both the incidence and the causation of postoperative thrombi are still matters of debate, but wherever the condition has been properly studied the incidence has always been found to be much higher than is believed. The incidence of postoperative thrombosis is related to the proportion of necropsies secured. For the past five years Parsons has been able to obtain necropsies in about 75 per cent of all fatal cases in his surgical service, and he has observed a relatively high incidence of pulmonary embolism and of antecedent venous thrombosis. The complication is most often observed after surgery, particularly on the pelvic organs. A nonpelvic origin is not infrequent, and surgery does not necessarily precede the development of pulmonary embolism. Thrombosis should be borne in mind as a possibility following any operative procedure and should be immediately presumed to exist if several days after operation there is unexpected or unexplained low grade fever or if there is tenderness in the calf of the leg on dorsiflexion of the foot (Homans' sign). When thrombosis or thrombophlebitis has been diagnosed or is seriously suspected, exploration of the femoral vein is a wise precaution. If pulmonary infarction has developed, it should be carried out without delay. With this treatment should be combined the administration of dicumarol, which is also a prophylactic measure; but dicumarol should never be employed without adequate control in the form of daily estimations of the plasma prothrombin time. If the plasma prothrombin time becomes dangerously lengthened, the administration of a vitamin K preparation or transfusion is indicated.

Virginia Medical Monthly, Richmond

72:235-272 (June) 1945

Symposium on Nutrition. W. H. Higgins.—p. 238.
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Nutrition in Preventive and Industrial Medicine. I. C. Riggin.—p. 247.
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Oculoglandular Tularemia: Report of Case. D. Guerry III.—p. 295.
Chaplaincy at Medical College of Virginia. G. Ossman.—p. 297.
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Theory and Practice in Preparation of Nurses. A. W. Hurd.—p. 303.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Experimental Pathology, London

26:1-66 (Feb.) 1945

Change from Benign to Malignant in Chemically Induced Warts in Mice. J. C. Mottram.—p. 1.
Inhibition of Carcinogenic Action Produced by Weekly Carcinogenic Hydrocarbon on Highly Active Carcinogenic Hydrocarbon. A. Lacassagne, Buü-Hoi and G. Rudali.—p. 5.
Significance of Basophil Changes in Pituitary Accompanying Various Forms of Thyroxine Deficiency. W. E. Griesbach and H. D. Purves. —p. 13.
Studies on Experimental Goiter: VI. Thyroid Adenomas in Rats on Brassica Seed Diet. W. E. Griesbach, T. H. Kennedy and H. D. Purves.—p. 18.
Reaction of Products of Initial Stages of Peptic Proteolysis of Human and Horse Serum Albumin with Antiserums to Original Albumins. A. Kleczkowski.—p. 24.
Conversion of Nonprecipitating Inhibiting Protein Complexes into Forms Again Precipitable by Antiserums to Original Proteins. A. Kleczkowski.—p. 33.
Specific Precipitation of One Protein by Antiserum to Another. A. Kleczkowski.—p. 41.
Levulose Tolerance in Acute Hepatitis. C. H. Gray.—p. 49.
Treatment of Experimental Gas Gangrene Due to Clostridium Welchi with Penicillin and Antitoxin. F. P. O. Nagler.—p. 57.
Acceleration by Means of Prolonged Mechanical Irritation of Carcinogenesis in Skin of Mice Painted with 1: 2: 5: 6-Dibenzanthracene. J. F. Riley and F. W. Pettigrew.—p. 63.

British Journal of Ophthalmology, London

29:277-332 (June) 1945

Iridoschisis with Multiple Rupture of Stromal Threads. A. Loewenstein and J. Foster.—p. 277.
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Observations on Effect of Riboflavin on Oral Lesion and Dysphagia, and of Riboflavin and Brewers' Yeast on Dark Adaptation in Case of So-Called Plummer-Vinson Syndrome. H. Pollak.—p. 288.
Sjögrens Syndrome, Especially Its Nonocular Features. F. P. Weber. —p. 299.
Treatment of Septic Ulcer of Cornea by Local Applications of Penicillin. F. Juler and M. Y. Young.—p. 312.

British Journal of Radiology, London

18:133-166 (May) 1945

Radiology of War Injuries: Part III. War Wounds of Chest. D. B. McGrigor and E. Samuel.—p. 133.
Dosage Distribution in Treatment of Ringworm by X-Rays. S. B. Osborn, Diana R. Tavener and F. T. Farmer.—p. 145.
Condenser Ionization Chambers for Measurement of X-Rays in Body Cavities: Physical Problems in Their Design. F. T. Farmer.—p. 148.
Disk Lesions in Relation to Pain. A. C. Mooney.—p. 153.
Effect of Variations in the Dose Rate of Gamma Radiation on Cell Degeneration in the Frog Tadpole. A. Glucksmann, K. Tansley and C. W. Wilson.—p. 158.

British Medical Journal, London

1:619-652 (May 5) 1945

Applications of Surgical Lessons of War to Civil Practice. W. H. Ogilvie.—p. 619.
*Outbreak of Hepatitis in Diabetic Clinic. H. Droller.—p. 623.
Transmission of Infection During Withdrawal of Blood. K. Mendelssohn and L. J. Witts.—p. 625.
Iron Deficiency Anemia in Northwest Indian Soldiers. M. Hynes, M. Ishaq and T. L. Morris.—p. 626.
"Eczema Autolytica." W. Smith.—p. 628.
Segmental Movement of Pupil. I. S. McGregor.—p. 629.

Hepatitis in a Diabetic Clinic.—Droller says that from January 1943 to January 1945 63 diabetic patients attending the clinic at the Royal Hospital in Sheffield were diagnosed as suffering from hepatitis. This clinic supervises approximately 450 patients. Anorexia, loss of weight and vomiting were the symptoms most frequently encountered in the patients with hepatitis. Tingling of fingers and neck rigidity may have been early neurologic manifestations. Owing to the sudden disturbance of the carbohydrate metabolism, immediate complications occurred in a number of patients. Insulin had to be increased and the diets altered. Another complication was acute atrophy of the liver, which caused the death of 2 of the patients. Delayed complications occurred in 8 patients, of whom 2 died of cirrhosis; the remaining 6 are in various stages of ill health. The epidemic occurred at a time of a high incidence of the disease among the general population. It appears that both contact and syringe transmission occurred. There was queueing for weighing and bleeding. As the blood was collected in syringes which were not boiled, it is possible that small amounts of infective material might contaminate the needles. In view of the possibility that infected syringes were the cause of the epidemic, all routine blood letting was stopped after Sept. 1, 1944 and bleeding was done only in special cases. Since then, although the technic of blood drawing has not been changed, only 1 case has appeared after an interval of ninety-three days. With the abolition of routine blood letting, overcrowding has diminished and with it droplet infection.

1:653-688 (May 12) 1945

War Neuroses After Psychologic Trauma. R. D. Gillespie.—p. 653.
*Gas Gangrene, with Special Reference to Vascularization of Muscles. R. W. Power.—p. 656.
Arsenical Encephalopathy: Note on Condition, Stressing Value of Postural Treatment, with Case Records. G. A. Ransome, J. C. S. Paterson and L. M. Gupta.—p. 659.
Prolapse of Rectum in Women. H. Chapple.—p. 661.
Tuberculosis of Lower Lobe. R. C. Cohen.—p. 662.
Prevention of Migraine by Oral Administration of Carbachol: Analysis of 12 Cases. A. K. James.—p. 663.
Rheumatism: Postgraduate Instruction. A. Abrahams.—p. 671.

Gas Gangrene and Vascularization of Muscles.—Power reports 20 cases of gangrene encountered among 6,000 wounded in a general hospital during the fighting in Normandy. Adequate notes are available on 16 of these 20 cases. Three factors are essential for the establishment of gas gangrene—the presence of pathogenic clostridia, an adequate mass of ischemic or necrotic muscle and delayed or faulty surgery. Ischemic or necrotic muscle is essential for the establishment of gas gangrene. If a small piece of shell passes through the thigh causing no arterial damage, gas gangrene will not develop; natural resources can cope with such damage. If a similar piece of shell passing through the thigh should strike an artery, muscles are rendered ischemic and form a suitable pabulum for micro-organisms. If clostridia are present in such a wound, gas gangrene will develop. Of the 16 cases under review, 14 occurred in the lower limb and 2 in the upper. This is accounted for by the more abundant arterial anastomosis of the arm and by the relative vulnerability of the leg owing to its greater mass. The author differentiates between massive gas gangrene resulting from damage to the main artery of a limb and localized gas gangrene resulting from laceration of muscular branches. There were two deaths, both resulting from gas gangrene following injury to the popliteal artery. The distribution of clostridia is widespread. They can be grown almost without fail from the battle dress. There still exists a fallacious belief that direct contact with the soil is the chief causal factor of gas gangrene. The Cutler and Sandusky findings contradict this view. The clothing is the important vehicle, especially the battle dress, which is largely composed of wool. In the desert warfare 30 per cent of all wounds contained the organism of gas gangrene, yet only 1 per cent of those so contaminated developed anaerobic myositis. In only 0.33 per cent of all wounds has arterial damage been inflicted and a sufficient amount of ischemic muscle produced on which the clostridia can multiply. The elimination of gas gangrene can come only from early and efficient surgery.

1:689-722 (May 19) 1945

*"Primary Atypical Pneumonia": An Epidemic Associated with Malaria. J. Fleming, E. W. Lindbeck and I. H. Evans.—p. 689.
Incidence of Puerperal and Lactational Mastitis in an Industrial Town of Some 43,000 Inhabitants. A. A. Fulton.—p. 693.
*Further Case of Paranoid Psychosis Successfully Treated by Adrenalectomy. C. Allen and L. R. Broster.—p. 696.
*Hypertrichosis with Mental Changes: Effect of Adrenalectomy. R. Greene, A. S. Paterson and G. C. L. Pile.—p. 698.
Treatment of Impetigo: Virtues of Calamine Liniment and Minor Drawbacks of Local Sulfonamide Therapy. Mary S. Smith and E. C. Jones. —p. 699.
Child's Acquisition of Speech. Mary D. Sheridan.—p. 707.

Primary Atypical Pneumonia Associated with Malaria.—Fleming and his associates report 112 cases treated in a military hospital in Italy. In most of the cases the onset was acute, and a high intermittent fever was present for an average of eight days. There was considerable debility, requiring from four to six weeks of convalescence, so that the majority of

these men were off duty for about eight weeks. Many of the patients were admitted during a period when there was a heavy incidence of malaria. About one third had the typical lung lesion in association with malaria. The presence of malaria had no influence on the period of pyrexia. The authors think that if they had not been aware of the prevalence of atypical pneumonia many of the malaria infected cases might, from physical signs alone, have been assumed to be merely associated bronchitis of malarial origin. Several cases presented an acute onset resembling malaria, and the diagnosis became clear only as the illness progressed unaffected by quinine therapy. There was no evidence that the association of atypical pneumonia and malaria was other than fortuitous. Sulfathiazole and sulfapyridine had no effect on the course of the illness, but the authors ascribe the absence of complications to their routine use. There was no indication that they had any toxic effect on the polymorphonuclear leukocytes, and when used in combination with full doses of quinine, in the malaria cases, no adverse effect was noted.

Adrenalectomy in Paranoid Psychosis.—Allen and Broster say that a special study of adrenal disease has been made at Charing Cross Hospital since Broster performed an adrenalectomy on a patient with sexual precocity over fifteen years ago. It was noted that women with virilism were often abnormal and sometimes psychotic. Broster's publication on this problem attracted the attention of Gillespie, who discovered a woman with a severe schizophrenic paranoid psychosis combined with adrenogenital virilism. Following the removal of one adrenal she made a complete recovery. The authors present a similar case in which adrenalectomy was performed. This is the sixth case in which adrenogenital virilism has been combined with a psychosis. The response to adrenalectomy was similar to the one in the previous case.

Adrenalectomy in Hypertrichosis with Mental Changes.—Greene and his associates report the case of a woman aged 25 who had hypertrichosis associated with mental changes, which gradually resolved after adrenalectomy. The psychologic changes preceded the external physical changes. When first seen she was drifting into a tense hypochondriacal state. The removal of most of the causes of her anxiety did not bring about her recovery. Only after operation was she set on the road to recovery.

Indian Medical Gazette, Calcutta

80:61-120 (Feb.) 1945

Subacute Constrictive Pericarditis. R. Viswanathan.—p. 61.
Diagnosis of Early Gastric Cancer (with Review of 60 Cases). D. J. Jussawalla.—p. 63.
Nutritional Diarrhea. W. R. Aykroyd and C. Gopalan.—p. 68.
Fulminating or Malignant Cerebrospinal Fever. I. Jit and S. D. Chugh. —p. 74.
Amebiasis of Anus and Perineum, with Report of Case. R. M. S. McConaghey.—p. 79.
Physical and Immunologic Reactions of RBC "Juice" and Stroma. S. D. S. Greval and A. B. R. Chowdhury.—p. 81.
Experimental Studies in Rat Bite Fever. B. C. Basu and S. Sen.—p. 82.
*Amebiasis and Blackwater Fever. C. McGuire.—p. 84.
Oriental Sore in Nizam's Dominions: Epidemiologic Factors. M. Farooq and M. Qutubuddin.—p. 85.
Voges-Proskauer Test with Leifson's Reagent. G. Panja and A. N. Bose. —p. 89.
Distribution of Typhoid VI Agglutinins in Normal Serums, with Special Reference to Their Diagnostic Value in Typhoid. D. W. Soman. —p. 90.

Amebiasis and Blackwater Fever.—McGuire has observed during the past twelve years 33 cases of blackwater fever in Bengal Dooars, where malaria is hyperendemic. The history of these cases was always the same, namely repeated attacks of malaria which were controlled by quinine, then suddenly the development of blackwater fever during one of these attacks after taking quinine. A popular view among the medical practitioners in the Dooars is that the causation of blackwater fever has something to do with the liver. Some workers recognize a preblackwater stage, which is characterized by an enlarged and tender liver. Krishnan and Pai concluded that liver damage and altered metabolism are factors in the etiology of the disease. McGuire was struck by the observation that among his 33 cases of blackwater fever there were 21, or 63.6 per cent, with the clinical signs of amebiasis. A tender and thickened cecum and ascending colon and an enlarged and tender liver were present. Microscopic examinations of the stools showed Endameba histolytica. Though clinical signs of amebiasis were present in 9 cases, no protozoa were found. It is possible that the amebiasis in his series is a coincidence, but in view of the work of Krishnan and Pai it is also possible that amebic hepatitis may in some cases cause liver damage of a type that will help in the production of the biochemical blood changes reported by them, especially when these patients have a superimposed malarial infection. Quinine may cause further deterioration and act as an immediate excitant. The exciting cause in all the author's cases of blackwater fever was quinine. In no case did blackwater fever recur after atabrine.

Journal of Laryngology and Otology, London

59:309-346 (Sept.) 1944

Ascertainment of Deafness in Infancy and Early Childhood. I. R. Ewing and A. W. G. Ewing.—p. 309.
Ménière's Disease: Results of Treatment of 60 Cases by Alcohol Injection Through Footplate of Stapes. A. J. Wright.—p. 334.

Jour. of Obst. & Gynaec. of Brit. Empire, Manchester

52:97-216 (April) 1945

*Hypoplasia of Uterus and Spasmodic Dysmenorrhea. T. N. A. Jeffcoate and Sylvia Lerer.—p. 97.
Uncomplicated Primigravid Breech: Technic Used in 60 Cases. D. S. Greig.—p. 122.
*Relation of Vitamin B_1 Deficiency to Pregnancy Toxemias: Study of 371 Cases of Beriberi Complicating Pregnancy. G. King and L. T. Ride. —p. 130.
Studies in X-Ray Pelvimetry: Evaluation of Pelvic Radiography, with Plea for Simplicity. O. S. Heyns.—p. 148.
Effect of Testosterone Propionate in 2 Cases of Ovarian Carcinoma. J. Wyatt.—p. 174.
Note of Case of Exstrophy of Bladder with Procidentia. S. G. Clayton. —p. 177.
Extragenital Chorionepithelioma: Report of Case with Chorionepithelioma of Breast Occurring During Course of Pregnancy. L. Resnick. —p. 180.
Case of Coexisting Tuberculosis and Cancer of Uterus. G. H. Smith. —p. 189.
Dysgerminoma of the Ovary in Child of Five Years with Acute Torsion of Pedicle. P. A. McNally.—p. 193.

Hypoplasia of Uterus and Spasmodic Dysmenorrhea.—According to Jeffcoate and Lerer dysmenorrhea is related to contracture of the uterus. The difference between painful and painless contractions lies in their character rather than their strength. The pattern of uterine motility causing pain during menstruation is unknown, but the view which supposes incoordination of different areas of the uterus, or disturbed polarity of the uterus, has still to be disproved. The theory which supposes uterine hypoplasia as the cause of the abnormal uterine contractions, and the evidence on which it is based, are critically examined in the light of what is known about the development of the uterus. An analysis of the histories of 829 patients suffering from spasmodic dysmenorrhea shows that not more than 27 patients had signs of uterine hypoplasia. The age at the menarche was usually within normal limits. Scanty and infrequent menstruation was exceptional, and most women had a regular cycle. Endometrial studies showed that the histologic phase generally agreed with the time of the menstrual cycle. Painful menstruation is usually ovular in type. Of 457 patients, some had minor malformations of the uterus; but these faults are not accepted as an indication of hypoplasia. The existence of an interval between the menarche and the onset of dysmenorrhea in a large percentage of cases is confirmed. This in itself is evidence against the hypoplasia theory. An analysis of a second series of 86 patients, all of whom had a hypoplastic or atrophic uterus, shows that of the 28 women who were menstruating only 1 had dysmenorrhea of an incapacitating degree. The value of estrogen therapy in spasmodic dysmenorrhea is open to question. If it gives relief, it does not necessarily do so by overcoming hypoplasia. The evidence is insufficient to prove or disprove the hypoplasia theory of dysmenorrhea, and it will remain so as long as the pathology of uterine hypoplasia is in doubt.

Vitamin B_1 Deficiency and Pregnancy Toxemias.—King and Ride say that there was a striking increase in the incidence of beriberi in Hong Kong during the years 1939, 1940 and 1941. An almost parallel increase was observed in pregnancy toxemias,

particularly eclampsia and preeclampsia, the toxemia rate rising from 3.45 per cent during the preceding three years to 7.82 per cent during the three years under review. Some correlation seems possible. It was found that of 371 pregnant women with beriberi 252 had pregnancy toxemia. The diagnosis of beriberi and pregnancy toxemia was supported by clinical and laboratory findings. Significantly high readings of the pyruvic acid content of the blood were obtained in the great majority of cases. In women with toxemia and beriberi the prognosis was considerably more grave than in cases of toxemia without frank signs of beriberi. This was particularly seen in the eclampsia cases, in which a mortality rate of 38.8 per cent was found in 36 cases complicated by beriberi as opposed to 11.6 per cent in 43 uncomplicated cases. It is suggested that the primary factor responsible for the heavy increase in pregnancy toxemia during the years under review was vitamin B_1 deficiency. Prophylaxis and/or active treatment by the exhibition of adequate amounts of vitamin B_1, whether in the form of a vitamin rich diet or as thiamine medication, is suggested as perhaps the most important single measure in dealing with pregnancy toxemia.

Lancet, London

1:551-582 (May 5) 1945

Wounds of Knee Joint. B. H. Burns, R. H. Young and G. M. Muller.—p. 551.
Order and Disorder in Large Intestine. T. L. Hardy.—p. 553.
Effect of Penicillin on Cultures in Liquid and Solid Mediums. R. Knox.—p. 559.
*Tracheotomy in Bulbar Poliomyelitis. A. Nelson-Jones and R. H. H. Williams.—p. 561.
DDT Treatment of Mange (Scabies) in Rabbits. B. G. T. Elmes.—p. 563.
The Returned Prisoner of War. G. C. Pether.—p. 571.

1:583-614 (May 12) 1945

Revival of Early Wound Closure: Two Stage Operation as Applied in Italy. H. C. Edwards.—p. 583.
Policy of Delayed Suture: Role of Forward Surgeon. F. A. R. Stammers.—p. 586.
Treatment of Battle Wounds: Two Stage Operation. W. M. Capper.—p. 587.
Wounds of Soft Tissue: Two Stage Treatment. J. J. M. Brown.—p. 588.
Administration of Penicillin by Mouth. N. G. Heatley.—p. 590.
Time of Occurrence of Secondary Familial Cases of Infective Hepatitis. A. M. McFarlan.—p. 592.

Tracheotomy in Bulbar Poliomyelitis.—Nelson-Jones and Williams report the history of a man aged 33 in whom tracheotomy was done to overcome the difficulties of bulbar symptoms. They stress that tracheotomy should not be postponed until the patient is about to die. The treatment should include aspiration by a rubber catheter passed from time to time into the tracheotomy tube and connected with an electric sucker; penicillin and sulfathiazole during the first week; vocal rest; and a nutritious fluid diet with adequate vitamins A and B_1 given by Ryle tube, which can be tolerated for weeks with occasional removal for cleaning.

Practitioner, London

154:337-400 (June) 1945

Prevention of Disease in Infants. J. M. Mackintosh.—p. 154.
Common Feeding Difficulties in Breast Fed Infants. K. H. Tallerman.—p. 343.
Infantile Diarrhea. W. Gunn.—p. 348.
Infantile Eczema. R. T. Brain.—p. 358.
Pneumonia in Infancy. E. F. Dott.—p. 363.
Clinical Signs of Nutritional Deficiencies. H. M. Sinclair.—p. 371.
Cervical Discharge. M. M. White.—p. 380.

Archives des Maladies Professionelles, Paris

6:1-60 (Nos. 1 & 2) 1944

Visceral Repercussions of Acute Carbon Monoxide Poisoning. M. Loeper, A. Varay, J. Cottet and J. Leveille.—p. 1.
Blood Changes in Course of Chronic Sulfocarbonism. L. Binet and F. Bourlière.—p. 12.
*Is Mononucleosis a Form of Myelotoxicosis Caused by Benzene? P. Mazel, D. Picard and J. Bourret.—p. 18.
Pathology of Work and Workers in Corporation of Building and Public Works. G. Saint-Martin and R. Le Baron.—p. 23.

Mononucleosis from Benzene.—Mazel and his co-workers report the case of a youth aged 19 who had worked in a shoe factory and for the last year worked with a paste containing benzene. He complained of growing lassitude and mild dyspnea on exertion. Examination of the blood revealed severe leukocytosis, at first a pure lymphocytosis and later a lymphomonocytosis with a plasmocytic tendency, giving a picture comparable to that of lymphomonocytic angina. This syndrome is accompanied by a mild impairment of the erythrocytic series with passage of few erythroblasts into the blood. The authors were unable to determine the duration of the process, as the discovery was accidental. It disappeared several weeks after the patient was removed from contact with benzene. Similar cases have been observed and reports published by other observers. These cases of mononucleosis induced by benzene have in common accidental discovery and cure after the patient is removed from the toxic atmosphere and given rest, and the hematologic syndrome is characterized by a mononucleosis.

Gynécologie et Obstétrique, Paris

44:1-60 (Nos. 1, 2 & 3) 1944

*One Hundred and Fifty Infiltrations of Lumbar Sympathetic in Course of Labor: Physiologic and Clinical Deductions. H. Pigeaud.—p. 1.
Evolution of Human Telancephalon During First Four Months of Embryonal Life. Madeleine Friant.—p. 7.

Infiltration of Lumbar Sympathetic During Childbirth.—Pigeaud employed infiltration of the lumbar sympathetic in the course of labor in 150 deliveries. Each infiltration consisted of 40 cc. of a 1:1,000 solution of nupercaine. For some time he made bilateral infiltrations at the level of the third to fourth lumbar vertebrae; then he made unilateral infiltrations on the left side from the second to the third lumbar vertebrae; with this method a painful zone sometimes persisted on the right side. With the bilateral infiltration complete analgesia is almost always obtained. Infiltration of the lumbar sympathetic of a woman in labor during the period of dilatation effects immediately or after several minutes the disappearance of pain for from one to two hours, or for seventy-five minutes on the average. Clinical observations and the graphic registrations showed that labor followed its usual course during the analgesic period. All infants were born alive. Infiltration of the lumbar sympathetic suppresses the severe pains which accompany the end of the period of dilatation.

Acta Dermato-Venereologica, Stockholm

25:111-206 (Sept.) 1944

Influence of External Factors on Cutaneous Manifestations in Syphilis. C. E. Sonck.—p. 111.
Etiology of Induratio Penis Plastica. N. Melczer.—p. 121.
Experimental Sensitization of Skin with 2-4-Dinitrochlorbenzene. T. E. Olin.—p. 135.
*Rubber Products as Widespread Cause of Eczema: Report of 80 Cases. P. Bonnevie and P. V. Marcussen.—p. 163.
*Percutaneous Photosensitization Due to Handling of Parsnips. Vera Starck.—p. 179.
Total Congenital Hereditary Alopecia. H. Lundbäck.—p. 189.

Rubber Products as Cause of Eczema.—A systematic investigation at the department of dermatology of the Finsen Institute, Copenhagen, showed that eczema caused by rubber is of rather widespread occurrence and not confined to certain occupations as previously supposed. Of the 80 reported cases, representing about 2 per cent of the cases of hypersensitivity eczema, only 25 were occupational. Rubber footwear and articles of clothing were the dominating causes of the eczema (about 74 per cent). Eruptions on the feet caused by rubber were in most cases difficult to differentiate from mycotic eczema. Etiologically the rubber itself was subordinate in relation to the accelerator agents used in manufacture. Of these mercaptobenzothiazole was the most frequent cause of sensitization. The prophylaxis of rubber eczema is sometimes difficult on account of the widespread use of rubber, its indispensability in certain garments and the penetration of the accelerator agents. Cold-vulcanized rubber can often be tolerated in cases in which there is only accelerator hypersensitivity.

Photosensitization Due to Handling of Parsnips.—Starck reports that in May 1943 a woman aged 43 applied to the dermatologic department complaining of an unusual looking skin change on her hands. She had been working in a cold storage room and for three weeks had been preparing parsnips. The change was most pronounced on her left hand. It involved only the dorsal side of the hands and a sharp, oblique demar-

cation line crossed the forearm, just where the sleeve ended. In the course of the following days 12 other patients arrived with similar symptoms. All 13 patients had been working in a factory which produced dried vegetables. Investigations revealed that the dermatitis was due to sensitization to light caused by work with parsnips. The author demonstrated in experiments that the parsnip root contains some substance liable to render the skin sensitive to a certain kind of radiation, that the sensitivity will remain for some time after the exposure to the plant and that the juice of the parsnip has not in itself any perceptible irritating influence on the skin.

Acta Medica Scandinavica, Stockholm

118:261-430 (Sept. 30) 1945. **Partial Index**

Studies on Influence of Magnetism on the Oxygen Absorption in Man. Karen Marie Hansen.—p. 261.
*Eosinophil Granuloma of Bone or Schüller-Christian's Disease. J. Engelbreth-Holm, G. Teilum and Erna Christensen.—p. 292.
Electrocardiographic Observations During Intravenous Injection of Acetylcholine. A. Stigaard.—p. 313.
*Acoustic Theory of Percussion. E. Bárány.—p. 345.
Accumulated Cases of Chronic Benzene Poisoning in Rubber Industry. K. J. Helmer.—p. 354.
Rapidly Recurrent Gastric Hemorrhage. J. Bok.—p. 376.
Electrocardiogram in Aortic Insufficiency, with Special Regard to Development of Left Bundle Branch Block Electrocardiogram. H. Rasmussen.—p. 385.
*Pathogenesis of Pernicious Tapeworm Anemia: Preliminary Report. G. Tötterman.—p. 422.

Eosinophilic Granuloma of Bone.—Engelbreth-Holm and his associates review the early descriptions of eosinophilic granuloma of bone. This is a painful tumor of a bone, most often of a membranous bone, which usually develops in a child or young person. Roentgenography reveals a solitary, sharply defined defect in the bone, sometimes with swelling of the corresponding soft part. Microscopic study discloses a granuloma made up of reticular cells with numerous eosinophilic leukocytes, sometimes also giant cells of the osteo lastic type. The blood and sternal bone marrow may show a moderate eosinophilia. The differential diagnosis must take into account osteomyelitis, Ewing's sarcoma, bone cyst and Schüller Christian's disease. The authors observed eosinophilic granuloma of bone in 5 children between 2 and 9 years of age. They observed transitions from solitary eosinophilic granuloma through cases with several osseous foci to a generalized case with innumerable foci in the bone system together with diabetes insipidus, disturbance of growth and roentgenographic changes in the lungs. In several cases in which the disease commenced as a solitary granuloma, continued observation has revealed additional foci, so that in the cases observed by the authors the number of foci increased with the length of the observation period. Morphologically transitions were demonstrated from the lipoid-free eosinophilic granuloma through granuloma with beginning lipoid phagocytosis with Touton cells to entirely xanthomatous tissue. The authors conclude that the concept of eosinophilic granuloma can no longer be regarded as a nosologic entity but has to be considered a not altogether infrequent clinical monosymptomatic form of Schüller Christian's disease that often heals without becoming generalized.

Acoustic Theory of Percussion.—Bárány discusses the relations between the acoustic properties of the thorax, the Fourier spectrum of the percussion impact and the loudness spectrum of the resulting percussion sound. The importance of matching the Fourier spectrum of the impact to the acoustics of the thorax is pointed out.

Pathogenesis of Pernicious Tapeworm Anemia.—Tötterman found that an alcohol extract of tapeworm, when administered parenterally to 2 persons who had suffered from pernicious tapeworm anemia, resulted in an impairment of the blood picture, which subsided again spontaneously when the preparation was discontinued. Some local and general symptoms were observed. A control person did not show any changes; 2 others showed a passing decline in the blood picture, which improved, however, even though the preparation was continued. According to the author, these results support the conception that an increased sensitivity to tapeworm poison assumes an important role in the pathogenesis of tapeworm anemia.

Nordisk Medicin, Stockholm

23:1345-1384 (July 21) 1944

Hospitalstidende

Serum Iron as Diagnostic Aid in Acute Hepatitis (continued report). S. Bjerre and N. R. Christoffersen.—p. 1345.

Hygiea

Mammary Tuberculosis: Review Together with 6 Personal Cases. I. R. Sandberg.—p. 1357.

23:1385-1420 (July 28) 1944

Humoral Control of Gastric Phase of Gastric Secretion. B. Uvnäs.—p. 1385.
Contribution to History of Chordotomy. H. Fabritius.—p. 1389.
Apparatus for Suction Drainage. W. Mascher.—p. 1390.

Hospitalstidende

Case of Plummer-Vinson Syndrome with Four Successive Carcinomas Treated with Riboflavin with Favorable Effect on Sideropenia. A. Videbaek.—p. 1391.

Hygiea

*Disk Degeneration in Lumbar Region. E. Severin.—p. 1393.

Disk Degeneration in Lumbar Region.—Frequent disturbances of more or less pronounced sciatic type which occur in cases with disk degeneration in the lumbar region can be explained partly by disk protrusion, partly by the occurrence of disk prolapse. Severin's study of 210 cases in 1939-1941 showed that, while clinical examination can give useful indications, definite diagnosis depended on roentgen examination. There were disturbances mainly attributable to degeneration of an intravertebral disk in 221 patients treated in the Orthopedic Clinic, Stockholm, in 1943.

23:1463-1506 (Aug. 11) 1944

Hospitalstidende

Calcium Deficiency and Renal Calculi Due to Spinach. B. Schmidt-Nielsen and K. Schmidt-Nielsen.—p. 1463.
Treatment of Hyperthyreosis with Thiouracil. G. Alsted and H. Lindholm.—p. 1467.
*Investigations on Blood Content of Pneumococcus Antibodies in Patients with Exudative Pleurisy with Reference to Etiology of Disease. F. Heintzelmann.—p. 1470.

Hygiea

Neurologic and Rhythmic-Biologic Points of View in Ulcer Problem. H. Laurell.—p. 1473.

Blood Content of Pneumococcus Antibodies in Exudative Pleurisy.—Heintzelmann's studies confirm the view that in almost all cases pleurisy is due to a tuberculous infection. Examination for pneumococcus antibodies may occasionally be useful, but the results must be evaluated with reservation and the positive outcome does not exempt from the usual control for tuberculosis. Patients with pleurisy after pneumonia should be carefully watched for possible later development of tuberculosis.

23:1623-1656 (Sept. 8) 1944

Hospitalstidende

*Sulfathiazole Filling and Primary Suture in Resection of Mastoid Process. M. Kjær and K. Kettel.—p. 1623.
Local Sulfonamide Treatment of Wound Cavity After Resection of Mastoid Process with Special Regard to Scarlatinal Mastoiditis. I. Falbe-Hansen.—p. 1625.
Micromethod for Estimation of Plasma Bicarbonate with van Slyke's Little Air Analyzer. S. E. Mikaelsen.—p. 1629.

Hygiea

Electroencephalography in Epilepsy. T. S:son Frey.—p. 1647.

Sulfathiazole Filling and Primary Suture in Mastoidectomy.—In treating 80 patients Kjær and Kettel used sulfathiazole filling 101 times in the cavity with primary suture. Secondary operations became necessary in 3 cases. The average healing time and wound secretion time was less than eight days. In scarlet fever mastoiditis the healing time averaged 19.9 days. Follow-up of 72 patients with 92 ears operated on from five to thirty months after the intervention showed normal hearing in 85 per cent; in 8 of the 10 cases with impaired hearing the loss of hearing was due to long continued processes in the middle ear prior to operation. The plastic result was excellent. The method is recommended in all simple cases of resection of the mastoid process.

Book Notices

Surgery of Modern Warfare. Edited by Hamilton Bailey, F.R.C.S., Surgeon, Royal Northern Hospital, London. Sub-Editor for Medicine, C. Allan Birch, M.D., M.R.C.P., D.C.H., Senior Physician, North Middlesex County Hospital, London. Volumes I and II. Third edition. Cloth. Price, $20. Pp. 506; 507-1108, with 1,128 illustrations. Baltimore: William Wood & Company, 1944.

With the close of the war in Europe it is again possible to assess the lessons learned from a large experience with trauma resulting from combat. The advances of surgery and its related sciences in the past twenty-five years have resulted in a gratifying decrease in mortality and morbidity. Much of this is due to such successful attempts at prophylaxis as exemplified by the practical elimination of tetanus. A more accurate evaluation of shock and the elimination of much serious infection with modern chemotherapy has resulted in great conservation of life and limb. The surgeon with the armed forces is grateful for adequate equipment, blood and its substitutes, sulfonamide drugs, and penicillin in the treatment of war injuries. He appreciates especially the training and experience of modern surgical teaching, which is basically responsible for the improvement in treatment of combat casualties.

The lessons taught to surgeons by their experiences with modern warfare are well described by the author and his collaborators. The organization of this edition is much the same as that of the last. The work is in two volumes and consists of twenty-one sections representing the opinions of various contributors. Characteristically the writing is clear, precise and literate. Instructions are presented in a typically positive manner which can form an accurate guide to treatment.

Volume I contains a brief summary of warfare instruments and their destructive effects. Such bizarre injuries as result from air and water explosions are effectively described. The nature of wounds and types of contamination are scientifically exposed. It is indicative of the rapid advances made that sulfonamide drugs receive much more attention than in the previous edition, but only a few words can be allotted to penicillin, although its importance is recognized. Other sections in the first volume are concerned with shock, burns, anesthesia and the management of various types of wounds. Some deviations from American practices may be pointed out without undue criticism. The petrolatum gauze pressure dressing treatment of wounds is not emphasized; the tannic acid method, interdicted by United States authorities, is cautiously advocated. The value of whole blood and the need for large amounts of plasma in the presence of shock are definitely suggested.

Wound excision and primary closure are not endorsed as enthusiastically as they were in previous publications. Instead accurate débridement and the so-called surgical toilet are preferred. The local use of sulfanilamide is recommended more wholeheartedly than in former discussions. It should be noted that the use of sulfanilamide locally is not a substitute for adequate surgery. This section has become a particularly valuable summary of knowledge gained by wide and long experience.

Volume II contains sections dealing with regional types of wounds and their treatment. In general, measures to be taken and complications and sequelae to be expected are well outlined. The management of thoracic and abdominal wounds, especially the treatment of hemothorax, is adequately delineated. The section on amputations contains many valuable suggestions which will profit the reader. The doctor with the armed forces has learned to be conservative in his early treatment of war wounds and, conversely, to be more radical in the treatment of the aftermaths and sequelae. Skin grafting, reamputation, and radical orthopedic and plastic procedures are now feasible. The peculiar properties of modern warfare have made wounds of the extremities a serious problem. In this respect peripheral nerve injuries have attracted a great deal of attention. The subject is well covered in this book with the exception of causalgia, which is a frequent and disabling complication. This should receive more attention, since there are now logical procedures to alleviate this distressing condition.

The illustrations cannot be passed over lightly. Their accumulation is a credit to the industry of the author. Many of the anatomic drawings are aptly refreshing. The form and organization of the text are such as to make for ready reference.

The Management of Obstetric Difficulties. By Paul Titus, M.D., Obstetrician and Gynecologist to the St. Margaret Memorial Hospital, Pittsburgh, Pa. Third edition. Cloth. Price, $10. Pp. 1,000, with 434 illustrations. St. Louis: C. V. Mosby Company, 1945.

This edition, which is slightly larger than the previous one, contains a number of additions and changes, particularly in the chapters on sterility, antepartum care and management of pregnancy, labor and the puerperium. The chapters on x-rays, pelvimetry, toxemia, intravenous infusions and blood transfusions have been rewritten, and sections on caudal anesthesia and penicillin have been added. The reviewer still is of the opinion that the section on sterility (almost eighty pages) does not properly belong in a textbook dealing with "obstetric difficulties." In this section figure 46, which illustrates artificial insemination, shows the tip of the syringe at or beyond the internal os. Injection of semen this high up may lead to trouble. Many other illustrations deal with gynecologic subjects not obstetric ones such as condylomas, coagulation of Skene's glands and Bartholin gland abscess and its treatment by coagulation and surgical removal. Likewise the nine pages describing and illustrating cauterization and conization of the cervix are outside the sphere of obstetric difficulties. Figure 386 (p. 856), "Prolapsus uteri," is the same as figure 69 (p. 147). One other criticism is that the bibliography has not been brought down to date. Titus frequently refers to both Williams and De Lee. In most instances the 1930 edition of the Williams textbook is listed, but this may be because the 1930 edition was the last one Williams himself wrote. However, the reference always given for the De Lee quotations is the 1933 one, although two editions have appeared since then. In spite of these minor shortcomings this book should be in the library of every physician who practices obstetrics. It is well written, is beautifully and abundantly illustrated and is based on an extensive experience as an obstetrician and gynecologist, investigator, teacher and secretary of the American Board of Obstetrics and Gynecology. This edition should be even more popular than the previous ones.

A Symposium on Mammary Tumors in Mice. Publication of the American Association for the Advancement of Science No. 22. By Members of the Staff of the National Cancer Institute, National Institute of Health, United States Public Health Service. Edited by Forest Ray Moulton. Cloth. Price, $4. Pp. 223, with illustrations. Washington, D. C.: The Association, 1945.

The symposium is made up of twelve articles by active workers in the National Cancer Institute. The introduction, general and historical, is by M. B. Shimkin. The cytology and histogenesis of mammary cancer in mice are covered by A. J. Dalton and T. B. Dunn, the vascular supply by G. H. Algere and H. W. Chalkley, the genetics by W. E. Heston, the hormonal relations by B. M. Shimkin, the milk factor by H. B. Andervont, the effect of diet and other agencies by H. P. Morris, the chemistry by J. P. Greenstein and experimental treatment by H. M. Dyer. In the final article M. B. Shimkin summarizes the main outcome of these articles, with discussion of its bearings on cancer of the human breast. Critical analysis cannot be made of each article. The articles describe well the current state of knowledge and understanding of cancer of the breast in mice. The deep complexity of the problems of cancer is brought out impressively by the detailed consideration of a particular cancer in a particular animal. A high standard is set for symposiums on other types of cancer. The book will be of value to investigators as well as to all who wish to keep in touch with the progress of cancer research.

Bibliography of Industrial Hygiene 1900-1943: A Selected List. Compiled by Ellen F. Bellingham, J. J. Bloomfield, Senior Sanitary Engineer, and Waldemar C. Dreessen, Surgeon, United States Public Health Service. From the Industrial Hygiene Division, Bureau of State Services. Federal Security Agency, U. S. Public Health Service, Public Health Bulletin No. 289. Prepared by direction of the Surgeon General. Paper. Price, 20 cents. Pp. 95. Washington, D. C.: Supt. of Doc., Government Printing Office, 1945.

This helpful list of references covers the period 1900-1943. Although not entirely up to date, it does present conveniently the dependable sources of information about all important aspects of industrial health. Collections of textbooks and reference works should be checked against this list as a test of completeness and adequacy.

Medical Care of Merchant Seamen: A Handbook of Ship and Aircraft Sanitation and Emergency Medical Aid. By W. L. Wheeler Jr., M.D., Medical Director, Grace Line, Inc. Fabrikoid. Price, $2. Pp. 212, with 25 illustrations. New York: Cornell Maritime Press, 1945.

The purpose of this handy little book of pocket size is "to give the officers and men on shipboard a basic knowledge of what they could do for themselves and their fellow seamen where medical care was not available." It does more than this in that there is included much general information, compactly presented. General sanitation, sanitary measures and disinfection are briefly but well covered, and simple means are described to combat existing conditions to be found on board ship. Many blank forms are presented, with careful complete instructions as to their preparation and disposition. A brief but clear description of elementary anatomy is given, easily understood by the layman.

Under the heading Medicine Chest there is a rather full compendium of medicinal substances with instructions for their use, more or less generally including the cause of the disease or condition and the effect of the remedy. Contagious and communicable diseases are described briefly but sufficiently in language which the layman and inexperienced can understand. Injuries and fractures are discussed, but the handling of fractures is too brief and casual. Certain common conditions which may be expected to appear at any time are well covered, with suggested treatment and "what to do." Childbirth at sea, precautions to be taken on tankers, resuscitation and care of survivors are given considerable attention. A whole chapter of twenty-two pages is given to conditions associated with aviation, completely presented in a general narrative and informative manner as to not only the adverse symptoms and psychologic effects but also the physical factors encountered. Quarantine for ships and aircraft is discussed at length, as is also the method of sending proper messages to obtain pratique. There is a description of spaces devoted to the use of the medical service and their arrangement and equipment, all of which is illustrated by drawings and conveys much detail as a guide to construction of such spaces.

Radio messages seeking medical advice by ships at sea are outlined carefully, that proper diagnosis and treatment may be obtained from a distance, especial emphasis being placed on the details of the patient and his illness. A list of marine hospitals and Public Health Service relief stations is given where aid or treatment may be obtained. A glossary of words and terms used in medical practice is appended to the text. There is also a good index. The book is well printed and bound.

A great deal of simple, understandable detail is contained in the text, and one concludes that the author gave a great deal of thought and review in preparation of it. An unusual amount of information is compressed into a small volume. It is a good general brief treatise on medical and surgical subjects. The style is readable. With this book as a guide the layman or inexperienced officer or sailor at sea can afford the sick or injured person fairly satisfactory care and attention. The book is therefore recommended to those going to sea without medical personnel on board.

Camping for Crippled Children. Editor: Harry H. Howett, Director, Social Research, The National Society for Crippled Children and Adults, Incorporated. By Committee on Camping: Ernest B. Marx, chairman, Gertrude Whitehead, Joseph E. Gembis, and Harry H. Howett, secretary. Cloth. Pp. 120, with illustrations. Elyria, Ohio: National Society for Crippled Children and Adults, Inc., 1945.

Physicians, teachers of crippled children and social service directors who are interested in the problem of the crippled child have long recognized a need for a source book of information dealing with the problem of summer camps for crippled children. In every community which is large enough to have well developed plans of care for crippled children, the importance of summer camps has been recognized and many camps for crippled children have been established throughout America. Some of these camps have been well planned and well equipped with adequately trained personnel and intelligently outlined programs. In some instances, however, the organizations which were attempting to establish these camps have lacked leadership which was prepared by training or experience to develop a program which would offer the maximum in benefits to the children whom they wished to serve. This book should be of great help to all those who are interested in the welfare of crippled children. The author of the book has had long experience as a director of social research toward more complete solutions of the varied problems faced by clubs, societies and other organized groups whose efforts are dedicated to the care of crippled children and adults. He has been assisted in preparation of the book by specialists who have collaborated by writing chapters dealing with the various phases of the camping problem for crippled children. This book affords an outline which can be followed in either setting up new camps or in improving those which are already in existence.

Hayfever Plants: Their Appearance, Distribution, Time of Flowering, and Their Role in Hayfever, with Special Reference to North America. By Roger P. Wodehouse, Ph.D., Associate Director of Research in Allergy, Lederle Laboratories, Pearl River, N. Y. Volume XV, a New Series of Plant Science Books, edited by Frans Verdoorn. Cloth. Price, $4.75. Pp. 245, with 73 illustrations. Waltham, Mass.: Chronica Botanica Company; New York: G. E. Stechert & Co., 1945.

The approach is that of a botanist who is well versed in the field, laboratory and clinical aspects of pollen allergy. Dr. Wodehouse has already published a book and several papers on pollen morphology, in which science he has for years been the leading American authority. In the first fifteen pages he attempts to set forth all the essential facts of botany and pollen aerobiology as related to inhalant allergy. A perusal of these pages leaves one with the impression that wartime restrictions on book paper have caused serious contraction of this part of the original manuscript. A large share of the book is devoted to the classification, description, geographic distribution and clinical evaluation of hay fever plants and pollens. Verbal descriptions are supplemented by many original drawings of plants and flowers and of more than fifty highly magnified pollen grains. The last chapter is devoted to a careful condensation of all published pollen surveys by regions and localities. The format is excellent, and the material is well organized throughout and adequately indexed. Among other helpful features is the glossary. The book will be welcomed by all allergists and should be available for reference to every one concerned in any way with the subject of pollen allergy.

The Governing of Men: General Principles and Recommendations Based on Experience at a Japanese Relocation Camp. By Alexander H. Leighton, Lt. Comdr., Medical Corps, U.S.N.R. Published in Cooperation with the American Council, Institute of Pacific Relations, Inc. Cloth. Price, $3.75. Pp. 404, with illustrations. Princeton, New Jersey: Princeton University Press; London: Oxford University Press, 1945.

The author is a psychiatrist and social scientist who was assigned to the Japanese Relocation Center at Poston, Ariz. He there observed the social and psychologic problems of both the evacuees and the administration. His description of the events that led up to the strike and the dynamic forces involved in the explosion makes fascinating reading. The factual data are followed by a considerable description of the lessons learned from this experiment. The reader can understand the simple conclusions and advice laid down in the second part of the book after he has gone through a period of pessimism at the stupidity demonstrated by the administration in the data of part I. Certainly this book should be studied carefully by persons who are involved in the government of occupied territories. Any one who is concerned with the administration of groups would profit by this work. This applies to medical officers, industrial psychologists and psychiatrists, teachers and every one who takes his responsibility in a democracy seriously.

Industrial Toxicology. By Donald Hunter, M.D., F.R.C.P., Physician to the London Hospital. Being the Croonian Lectures for 1942 of the Royal College of Physicians of London. Cloth. Price, 10s. Pp. 80. New York & London: Oxford University Press, 1944.

These essays are the Croonian Lectures for 1942 and not, as the title suggests, a complete discussion of industrial toxicology. The entire series is an expression of an extensive personal experience and wide reading. The three metals lead, mercury and arsenic are discussed in the first lecture. Other lectures describe important aromatic compounds, chlorinated hydrocarbons and glycols.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

FACTORS WHICH PREDISPOSE TO HYPERTENSION

To the Editor:—**What investigations can be conducted to diagnose early arterial hypertension? Of what value is the cold pressor test or the apnea test? Are there any physiologic reactions such as thermal instability, a white dermographic reaction to light and heavy pressure, a negative or reverse oculocardiac reflex or a negative hippus that are suggestive of vasomotor instability or prehypertension? What hereditary factors predispose to hypertension, and how can these be assessed quantitatively? How can the important environmental tensions within a family containing one or more hypertensives be evaluated?**

M.D., Ontario.

ANSWER.—Forecasting the inevitable development of hypertensive disease is impossible prior to the appearance of the major phenomenon hypertension. The etiology of hypertensive disease may be divided into three groups: predisposing, provoking and perpetuating influences. The development of any disorder depends on the reaction of a vulnerable individual to provoking influences. It is impossible to anticipate just what protracted vasopressor stimulation an individual will be subjected to in the future. All that can be assessed is the probable relative importance of constitutional vulnerability as contrasted to multiple and variable provoking factors.

Of the several means of assessing the lability of the vasomotor mechanisms, the cold pressor test is probably the most useful of the clinically applicable procedures. The investigations of Hines and others have indicated a significant correlation between exaggerated response to vascular stimulation by cold and the subsequent development of hypertensive disease. However, one should repeat the test several times before drawing final conclusions. The type of response elicited should be consistent in each individual. Isolated observation should never be given much weight in clinical diagnosis. There are several other means of discovering circulatory instability, but they all suffer from one or more serious drawbacks. For example, it is quite possible to demonstrate exaggerated vasoconstriction induced by emotional stimulation. Anger, fear and annoyance all induce vascular hypertonia, which, if protracted, may lead to hypertensive disease. Exaggeration of such reaction is indicative of vasomotor instability. However, it is impossible to standardize emotional stimuli. The cold pressor test, on the other hand, is standardized as to the intensity and duration of stimulation by cold. As far as known there is no significant correlation between thermoinstability and increased vulnerability to hypertension. The typical migraine physique (Stieglitz, E. J.: The Migraine Physique, *Am. J. M. Sc.* **189**:359 [March] 1935) is characterized by extraordinary thermostability, and yet these patients frequently develop hypertensive disease. Similarly, significant correlation has never been demonstrated between dermographic reaction or the oculocardiac reflex and hypertension. It is sometimes useful to test the circulatory response to certain vasopressor stimuli other than cold or emotion, particularly when it is suspected that certain insults may be playing a provocative role in causing early variable hypertension. For example, it is well known that there exists great variation in individual susceptibility to tobacco smoke. Some individuals respond with a decided rise in their blood pressure following smoking, whereas others give little or no reaction.

The relative importance of environmental tensions within a family group cannot be evaluated with any precision. Their importance varies greatly, not only between individuals, but at different times in the same individual because of recent physical and emotional conditioning. For example, a family row occurring during the phase of premenstrual tension and irritability can be more upsetting than a similar row occurring at some other time. Fatigue, personal relationships, the depletions of minor infections, relaxation induced by alcohol, and the like can greatly affect vulnerability to emotional turmoil. Clinical judgment on the part of the physician is requisite for estimating the relative importance of the purely genetic factors of inheritance and the environmental factors associated with living in a tumultuous emotional environment. No tests can replace sound clinical sense or the judgment born of experience in diagnostic evaluation of all sorts.

INTRAVENOUS THERAPY OF BUERGER'S DISEASE

To the Editor:—**What is the status of intravenous infusions of hypertonic (5 per cent) solution of sodium chloride in the treatment of thromboangiitis obliterans? Can any harm come from the prolonged use of such a solution in quantities of 300 cc. on alternate days for one to three months?**

Jacob Greenblatt, M.D., Stamford, Conn.

ANSWER.—Hypertonic solution of sodium chloride for the treatment of thromboangiitis obliterans (Buerger's disease), which involves both arteries and veins, has been used extensively in certain clinics. Koga's suggestion was based on the idea that the viscosity of the blood is increased in this disease and he advocated large doses of isotonic solution of sodium chloride or isotonic solution of three chlorides to lower viscosity. A group of New York observers use various concentrations of sodium chloride and sodium citrate. Some feel that the 5 per cent concentration of sodium chloride may produce localized thrombi in certain individuals and advocate a 3 per cent or even a 2 per cent concentration. The usual plan of administration is to give 300 cc. of 3 to 5 per cent solution of sodium chloride intravenously three times a week for three months and then gradually decrease the frequency of treatment until a total of nine months treatment has been given. In more advanced cases the intensive treatment three times a week is continued.

There is an increase in pulse amplitude immediately after the injection, but this is transient. Some reactions occur, although they may be minimized by careful preparation of solutions, glassware and tubing.

The question immediately arises why such patients, if they really need sodium, could not receive it orally either in solution or in tablets. Drinking a gallon of chilled isotonic solution of three chlorides or the ingestion of ten 1 Gm. keratin coated tablets of sodium chloride may give striking pain relief and improvement in the status of the peripheral vascular system. The type of patient who shows a high red cell count, a high hematocrit and other evidence of chronic plasma loss will undoubtedly benefit from such a procedure. Later on, when other measures, medical and possibly surgical, have been instituted the sodium chloride solution can be dropped and a liberal intake of water continued.

Aside from the irritation of the vein, the inconvenience and expense of the frequent intravenous injection and the possibility of systemic reaction, patients with a diseased cardiovascular apparatus may be overloaded with a hypertonic solution of this volume, since the 5 per cent concentration of sodium chloride has to attract a considerable amount of water from the tissues to become isotonic. Actually it represents roughly 1,500 cc. of isotonic solution of sodium chloride, the 1,200 cc. having to come from the tissues. The patient becomes very thirsty and replaces this with more water. Hypertension and cardiovascular-renal disease definitely contraindicate such treatment. While this temporary increase in blood volume, in oscillations and in blood flow may be of some benefit, the same effect can be more simply accomplished by the oral ingestion of salt solution or by mechanical means which are capable of filling and stretching the venocapillary bed, such as intermittent venous hyperemia.

LUPUS ERYTHEMATOSUS DISSEMINATUS AND PREGNANCY

To the Editor:—**A white woman aged 25, a nullipara, developed an erythematous rash of the entire face during her second month of pregnancy. She had a normal delivery and an uneventful postpartum period except for a temperature of 102 F. the second day, with pyuria which cleared up in seventy-two hours on sulfadiazine 15 grains (1 Gm.) every four hours. There was a slight anemia; the white blood cell count was 12,000. The rash, which was considered toxic and expected to disappear after delivery, has persisted. On the twelfth day post partum there was arthralgia of the shoulders, wrists and fingers, an ascending temperature of 100 to 104 F., a sedimentation rate of 100 and a definite leukopenia, 1,500; the differential count was normal. The urine has pus cells and many red blood cells at times but not constantly. The patient was hospitalized seven weeks post partum. Agglutination tests and blood cultures were negative. The patient died eleven days following hospitalization. The diagnosis of lupus erythematosus disseminatus was made on admission. Penicillin and blood transfusions were tried without improvement in the patient's condition. How many cases are there on record of this disease beginning during pregnancy? Considering the fatality in this instance, did pregnancy mask the symptoms or hold the disease dormant until a sudden flare-up seven months after onset? Will the newborn baby be affected with the same or other ailments?**

George H. Jantzen, M.D., Queens Village, N. Y.

ANSWER.—Lupus erythematosus disseminatus is a serious disease with a poor prognosis, especially in pregnancy. It is relatively rare and it is quite unusual to have it begin during pregnancy. Cases have been seen in which a severe exacerbation has occurred during pregnancy. The prognosis in regard to the child, in general, is good.

RIGHT AXIS DEVIATION IN ELECTROCARDIOGRAM

To the Editor:—What is the significance of a right axis deviation in the electrocardiogram of a young adult both as to a theoretically disturbed or arrested prenatal cardiac rotation and also as to its clinical evaluation in the presence of precordial pain referred to the left arm and neck on physical exertion? What are the prognosis, the best management and the most recently accepted life expectancy?

M.D., California.

ANSWER.—The term right axis deviation includes two separate phenomena: (1) a shift in the electrical axis to the right as a result of an altered position of the heart; (2) strain on the right side of the heart. Of course the possibility of a mirror image dextrocardia in which the P, QRS and T waves are inverted must be ruled out. Experience, particularly in the armed forces, has shown that right axis shift is quite common in young people and may be severe in degree without evidence of heart disease. Congenital heart disease may lead to a similar finding or to evidences of right heart strain. Rheumatic mitral stenosis is the commonest cause of right heart strain in a young adult. Bronchial asthma or kyphoscoliosis might also cause a right heart strain at this age. A record similar to that seen in right axis shift or in right heart strain may be produced in the limb leads in a healed anterior wall myocardial infarct. While the last mentioned condition could explain the electrocardiogram referred to and the pain, it is unlikely. Noncardiac causes for the pain should be excluded. The prognosis, management and life expectancy do not depend on the presence of right axis shift or right heart strain but on the conditions which cause them.

VOMITING OF PREGNANCY

To the Editor:—A woman aged 29, apparently in good health, became pregnant three years ago and aborted spontaneously at six weeks after pernicious vomiting of two weeks. Two months ago a pregnancy was started and at one month vomiting again started and, in spite of hospitalization and proper management, a therapeutic abortion was done after three weeks of vomiting. The questions now are How soon may she try again? and What can be done in the meantime, besides building up her general health, to decrease chances of a repetition? Would administration of ovogesterone or vitamin B_6 as soon as a period is missed and before vomiting starts be of any value? If so, please state dosage.

M.D., Illinois.

ANSWER.—There is no known way of preventing hyperemesis gravidarum before pregnancy occurs except by making certain a woman's physical condition as perfect as it can be and by arousing in her every determination to use her will power to the utmost in an effort to control vomiting. In the case described, hypnosis should be highly successful. Pyridoxine hydrochloride, or vitamin B_6, may perhaps be of some value if administered before pregnancy even though there is no proof of this. This vitamin, as well as other forms of therapy including adrenal cortex, progesterone, sedatives and above all psychotherapy, should be begun a few days after a menstrual period is skipped. The dose of vitamin B_6 is 50 to 100 mg. given intravenously and repeated as necessary. The dose of adrenal cortex extract is 2 cc. given subcutaneously at daily intervals. If thiamine hydrochloride is used, between 50 and 100 mg. should be given daily. If progesterone is used, 5 or 10 mg. should be given intramuscularly daily. It does not matter when a patient like this conceives again. If she is in good physical condition she may try to become pregnant even as early as four months after the abortion.

MANAGEMENT OF COLITIS

To the Editor:—A patient has refractory ulcerative colitis which fails to respond to any and all treatment, including vaccine. He has had a good response in the past to the concentrated serum, but this seems to be no longer available. A number of pharmaceutical supply houses have informed me that they withdrew their serum because of lack of demand. Presumably the advent of the sulfonamides had much to do with this. However, this patient does not tolerate any of the sulfonamides. I understand that tyrothricin has been used empirically in retention enemas. What is the present status of serum? Is it on the market? What is known of the use of tyrothricin? Can anything be suggested that is not contained in the standard textbooks on the disease or in the current literature?

Frederick L. Sperry, M.D., Detroit.

ANSWER.—With the advent of the sulfonamides, the concentrated serum (antibody solution) came to be used less and less because these drugs were found to be of great help in the control of the active symptoms of the patient with ulcerative colitis. Unfortunately, they have not been useful in all cases of this type of colitis, and the serum continued to find its place for those who were sensitive to the sulfonamides. However, since the demand was small, its distribution was discontinued. Unless some more potent method of therapy becomes available, some of the pharmaceutical houses say that they will have it again for distribution after the war. The sulfonamides which have been of the greatest help in this disease have been azosulfamide, succinylsulfathiazole and sulfathalidine. So far, clearcut evidence has not been presented as to the value of tyrothricin or any of the other antibiotics as therapeutic agents to be given by rectal instillation. Penicillin has been helpful in the control of the acute symptoms of this disease in some cases. Streptomycin is about to receive a trial.

Other measures of therapy are referred to in a monograph by J. Arnold Bargen entitled "The Modern Management of Colitis" (Springfield, Ill., Charles C Thomas, 1943).

LOCAL INFECTION AND DRAINAGE OF CUTANEOUS LYMPHATICS

To the Editor:—I removed a lot of seborrheic warts from the back of a man aged 60, using electrodesiccation with local anesthesia. Some of the warts were as big as a nickel; there were about 20 of them; all were located on the upper back, some just above the midline of the back, horizontally. I covered them with a disinfectant lotion and protected against friction. The healing process was normal. Three weeks later the patient's lymph glands in the groin became swollen. He went first to an internist, who referred him to a surgeon. I did not know about this until the surgeon called me after having the patient under his care for two weeks. He stated that the swelling of the inguinal lymph glands was, in his opinion, caused by the removal of the seborrheic warts and by a possible infection therefrom. The warts had healed in the meantime except for a few which showed some little secretion but no pus. Is it possible that the removal of superficial seborrheic warts on the upper part of the back could cause a reaction such as the swelling of the inguinal glands three weeks after the removal of the warts?

Paul C. Rost, M.D., Los Angeles.

ANSWER.—The cutaneous lymphatics of the trunk are divided on each side of the body into two principal regions: a superior region drained by the axillary nodes and an inferior region from which the lymph is poured into the inguinal nodes and which includes the umbilicus. While most anatomists agree that the line of division between these two regions corresponds to an almost horizontal line, sloping somewhat behind and above, which passes anteriorly through the umbilicus and posteriorly through a point placed a little above the disk which separates the second and third lumbar vertebrae, variations in this level as high as the lateral margins of the tenth rib have been reported. The supraumbilical and infraumbilical regions do not communicate except by fine capillaries.

Although the query does not state the exact level on the back of the seborrheic warts, the fact that a little secretion was present at one of the operative sites might indicate a persistent low grade infection. In the absence of all other causes of inguinal adenitis it is possible that an inflammation of the superficial inguinal lymph glands could result from an infection in the subcutaneous tissue of the back below the level mentioned.

Reference:

Rouvière, H.: Anatomie des lymphatiques de l'homme, Masson et Cie, 1932; translated by M. J. Tobias, Ann Arbor, Mich., Edwards Brothers, Inc., 1938.

IMMUNIZATION OF INFANT TO YELLOW FEVER AND DIPHTHERIA

To the Editor:—An 8 month old baby is joining his father in a yellow fever zone. Is immunization advisable? Is there any risk of hepatitis due to the immunization? What is the dosage? How soon after passive immunization against diphtheria should active immunization be performed?

Captain, M. C., A. U. S.

ANSWER.—Immunization of a young child against yellow fever is advisable if it is going to a definite yellow fever area. There is no risk of hepatitis from this vaccination, as the vaccine now manufactured no longer contains the human serum which formerly sometimes caused jaundice. The dosage is the same as for adults. Active immunization against diphtheria may be performed when at least fifteen days have elapsed after passive immunization.

LICHEN PLANUS AND GOUT

To the Editor:—Has any one ever described a connection between lichen planus and gout? In one of my cases an attack of gout causes the skin condition to disappear. Whether it is the gout that is responsible for this or the colchicine he is taking is something that would be interesting to know.

Charles A. Beck, M.D., Chicago.

ANSWER.—A review of a considerable literature of recent and past years has failed to reveal any relationship between lichen planus and gout or any cases in which the two conditions were coincidentally associated. It would be of interest if the correspondent or other physicians would note the effect, if any, of colchicine on lichen planus not obviously associated with gout.